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ABSTRACT

The document describes the 18-month Phase I of the On Farm Management Project--supported by the World Bank and operated by Colorado State University and the Consortium for International Development--to design more systematic approaches to train people who will work in technical settings related to water management and irrigation channel construction projects in Pakistan. Separate chapters discuss developing a national standard for curriculum and training in on farm water management, evaluating on farm water management training program needs, establishing interdisciplinary program objectives, developing a curriculum guide, developing training modules, training of trainers, developing training programs for adult farmers and water users, and changing the motivation and training of water user associations. The report stresses that the key to improvement of training is the trainer himself. If he is well prepared, knows his material, and uses suitable training approaches which develop requisite skills among trainees, much progress will be made to improve the entire On Farm Water Management system and thereby utilize water resources more effectively in Pakistan. (NEC)

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Training and the Development of Curriculum Standards in On Farm Water Management: Pakistan, 1984-1985

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Prepared in conjunction with the Colorado State University project of the Consortium for International Development, On Farm Water Management, Phase I, Pakistan, 1984-1985, supported by World Bank.

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H.M.B.

Preface

The author worked in Pakistan for the On Farm Water Management Project, Phase I, supported financially by World Bank to the Government of Pakistan, under a project operated by Colorado State University and the Consortium for International Development.

The project extended for eighteen months during 1984 and 1985. The author worked as Training Expert to the four provinces' On Farm Water Managment programs, co-ordinated by the Federal Cell in Islamabad.

This publication has brought together various approaches begun in training during the project's life. An attempt has been made to present a "Case Study" by using materials developed by the author at the OFWM Training Institute, Lahore, and actually used by the faculty. Also, the subject matter content of the materials presented have by-and-large been related to rural sociology and Water User Association training. Finally, the approach envisioned for curriculum development and training has been to establish a more systematic way of training people who will work in technical settings related to water management and irrigation channel construction projects.

The key to improvement of training is the trainer himself. If he is well prepared, knows his material, and uses suitable training approaches which develop requisite skills among trainees, much progress will be made to improve the entire On Farm Water Management system and thereby utilize water resources more effectively in Pakistan.

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Chapter One

DEVELOPMENT OF A NATIONAL STANDARD FOR CURRICULUM AND TRAINING IN ON FARM WATER MANAGEMENT

I. INTRODUCTION

Training related to On Farm Water Management began in the summer of 1977 in the University of Agriculture at Faisalabad. A limited interdisciplinary training program comprising of seven departments and nine faculty members was initiated with the goal of providing project area field oriented training related to identifying farmers' problems in the field, "conducting planned demonstrations on the latest On Farm Water Management techniques and to organize committees to facilitate watercourse improvement and long term maintenance" (Westfall, et al., 1979). This program initiated at Faisalabad, Pakistan by the Colorado State University team funded by U.S.A.I.D., operated until 1980 when the On Farm Water Management (OFWM) Training Program was moved to Lahore. A new facility was constructed and a training program was established under the Director General for OFWM to train larger numbers of teams for precision land levelling, watercourse construction, surveying, and provide training to farmers in current water management technologies. The PC-I planning document for this project set targets to train 2290 field workers and supervisors. By 1981, 3900 people had been trained. Concurrently, the OFWM program has begun work in the

Northwest Frontier Province, Sind Province, and Baluchistan Province to institute training related to preparing field teams. In the Sind, more than a thousand had been trained by 1981. In the Northwest Frontier over five hundred had received training in the same period.

It should be understood that training as reported under "achievement" in various documents related to a number of things. Training meant that persons such as sub-engineers and engineers were brought to a training institute such as the facility at Lahore for a period of two months to receive theoretical lectures related to various aspects of water management and engineering and were also given some field work of a practical nature related to their classwork. The sheer numbers to be trained made it difficult for all individuals to receive hands-on skill related training, rather, demonstrations were more commonly utilized. For instance, how does one provide practical training in precision land levelling to a class of 40 when two tractors are used on a given field. A second problem related to giving practical experience was that the institute(s) did not own their own demonstration farm, rather used farmers' farms who were willing to cooperate. Thirdly, the logistics of transporting large numbers of students to field sites frequently were made difficult because of distance, cost, and supervision problems.

It should also be understood that "training' could imply a short course of one week's duration, or a day or two program held in the field with interested farmers. If three hundred farmers who were co-operating in the OFWM program came together for a day of meeting, three hundred were counted as having received training.

Finally, training performed at the administrative office in the other provinces was frequently performed during slack periods in watercourse construction by faculty or administrative staff who were largely oriented toward engineering as opposed to extension education, sociology or management.

In summary, training was not unified in its approach provincially or nationally, it was performed on demand for immediate need by senior professional employees of the program, it was not systematic as related to the curriculum, to training procedures and training of the trainers themselves.

The On Farm Water Management I project, 1983-1985, under the Consortium for International Development (Colorado State University) funded by World Bank, envisioned the development of a more systematic approach to training and curriculum development. This document depicts efforts made by all four provincial areas to design more systematic approaches in their training programs. Efforts of the Director of the Institute at Lahore, and its faculty were significant in bringing about change as were the efforts of others in each of the provinces and the Agricultural University at Faisalabad who cooperated to bring about a national standard for training in the form of a curriculum guide.*

II. SYSTEMATIC PLANNING FOR CURRICULUM DEVELOPMENT IN ON FARM WATER MANAGEMENT

Training Directors from all parts of Pakistan met in a National Conference in Lahore in January, 1984. They discussed ways to improve their training programs. One way to bring about improvement was to coordinate training efforts in On Farm Water Management through the establishment of formal curriculum development committees comprised of members from each of the provincial areas and from each of the disciplines represented. The conference focused on the training of future "trainers," or faculty, who would be needed in the development of new training institutions in Hyderabad, D.I. Khan and Quetta as well as those new faculty who would be appointed to the On Farm Water Management Training Institute at Lahore. It was understood that the educative process to be utilized by faculty (trainers) would need to be related to technical training, as opposed to a more general theoretical education approach commonly used in colleges. Conference members were also concerned with how to make national curriculum more relevant for those employed in On Farm Water Management Field Teams.

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*See Bergsma, H. M., & Gill, J. (Eds.). (1985). Curriculum guide in on farm water management, Government of Pakistan, Lahore.

Curriculum which had been developed, in the early stages of On Farm Water Management programs, had not been systematic nor had it been related directly to personnel job requirements. The Conference, therefore, set up committees which were assigned to study the job description of each group of employees and then design curriculum and training procedures which would be more task specific. The new curriculum committees were fortunate to have a great deal of background information available to them such as field manuals, directorate documents and university reports developed under U.S.A.I.D. funded projects in previous years including materials developed at Colorado State University and University of Agriculture, Faisalabad. Additionally, the Director and the faculty at the "Institute" at Lahore had already developed lectures and practical field exercises which were being used.

One major contribution of the work of previous consulting teams in On Farm Water Management had been to introduce a multidisciplinary approach in solving problems in On Farm Water Management. This approach, however, was not well utilized in the curriculum development process. Rather, faculty from each discipline area organized their lectures and practicums rather independently and with little dialogue with each other about how these disciplines could be tied together in a unified way. Perhaps the greatest lack in all of this was that curriculum was not developed systematically, and that heavy emphasis was placed on lecturing about engineering concerns of watercourse construction, surveying and precision land levelling. Little or no emphasis was initially placed on the management of water on the farmers' fields, on how to help farmers improve their farming practices, and how to work with farmers effectively in the development of Water User Associations (WUA), both for initial construction purposes and also for future maintenance of these watercourses. So, the curriculum committees tackled these problems related to farmer communications, to irrigation agronomy, to rural sociology, to management training and began to suggest what subject matter was appropriate for each area of need. This work continued for six months after the conference concluded.

Training which had been given in an organized fashion during the last seven years, occurred in Lahore at the Institute. Primarily this training was in applied engineering. Some training had been held in offices of Directorate staff as need arose, however, there had been few systematic efforts made to pull these various efforts together within the provinces, or among the provinces nationally. During a seven year period many watercourses were constructed in the Punjab, Sind, Baluchistan and in the Northwest Frontier. Achievements in watercourse construction to date have been amazing and speak to a real "success story." By 1981, two thousand watercourses, 6,232 kilometers in length had been constructed. More than 38,804 acres of land of small farmers had been levelled, the majority of which occurred in the Punjab. But each irrigation construction project required additional field staff who needed training. Therefore, the critical link in the entire On Farm Water Management scheme was the training and education of an ever increasing number of people to work with this project under the Ministry of Food and Agriculture.

A recent government decision required three thousand or more Extension Field Assistants to take a six week's course in On Farm Water Management at the Institute in Lahore during the next three years. This put a tremendous strain on the existing training process and on the trainers at the Institute, since only 40 students could receive training at one time during a six-week course. This course was to include practical training in land levelling, surveying, watercourse engineering, irrigation agronomy, and social/management concepts related to working with rural farmers. Trainers at the Institute took on this new challenge, however, the more theoretical curriculum which had been employed for professionals was considered to be largely unsuitable for field assistants who needed practical training in a number of skills. Thus, there was a need for the development of a new curriculum which would relate to the tasks of Field Assistants and Sub-Engineers on the field teams.

In the Northwest Frontier Provinces, Sind and Baluchistan there was a critical need to develop better training facilities. Directorate staff were busy with many administrative duties and consequently could devote very little time to the training functions. As more and more watercourses were to be constructed, and as new field teams were hired, less and less attention was able to be devoted to training these new people. It was evident that coordination of training and cooperation between the provinces was essential. So the First National Conference on Training and Curriculum Development struggled with the tremendous challenge of recommending more appropriate training methods and more relevant curricula for On Farm Water Management needs nationally.

But the Conference had to consider other needs also. In addition to the concerns of the provincial directorates to improve their training systems, funding agencies which supported improved training and curriculum development through the technical aid provided by their consultants lacked integration and a unified approach. Assistance had been provided by the World Bank's Consortium for International Development Project, the Asian Development Bank's Tate and Lyle Project and the various projects funded by U.S.A.I.D. These projects were very concerned with watercourse conveyance losses of almost 40% of all available water provided to farmers. These losses had continued in spite of the fact that irrigation channels had been constructed. Irrigation channel construction was, therefore, only a partial answer to On Farm Water Management. People who used water, the farmers, abused water and needed to be informed about improved irrigation practices. Additionally, the major aim of all funded projects was to improve crop production. This was not happening as rapidly as the funding agencies and government directorate had hoped. Farmers needed to receive training in irrigation agronomy. This required more and more trainers to train field teams and extension workers from the Department of Agriculture. The task ahead was huge indeed. Ad hoc measures would no longer suffice.

The National Conference on Training and Curriculum Development, therefore, looked for ways to solve the above problems. A systematic Inter-disciplinary Training Model was discussed and the way to introduce this was considered. In brief, the approach the Conference decided to use was:

1. Define the purpose of the On Farm Water Management Training System and its major operational goals. Develop objectives for each discipline area related to the goals, such as engineering, agronomy, sociology, etc.
2. Committees were then appointed to look at the job descriptions of each category of employee developed by

the directorate staff, assess the competencies each category would be required to have and finally develop learning tasks related to these competencies.

3. From this list of tasks the committees began to develop a curriculum which was "task specific" in nature. They were asked to suggest which training methodology would be most appropriate for the task related to training, whether these be theoretical in nature or skill related learning for practical field tasks. Ways to evaluate trainees' levels of success were then to be developed.
4. Finally, it was considered to be important to check the system's efficiency by looking at what worked or didn't work with those who received training.

   Methodological changes needed were to be fed back to committees of the institutes so that they could implement changes in their design of the curriculum for On Farm Water Management.
5. The final step to be taken was to look at the original purpose of the system annually so that the curriculum could be changed to meet new needs. For instance, Rural Sociology was added to the curriculum in 1984 so that trainees would learn about barriers to change and how to deal with people from different social groups in the transfer of technology process.

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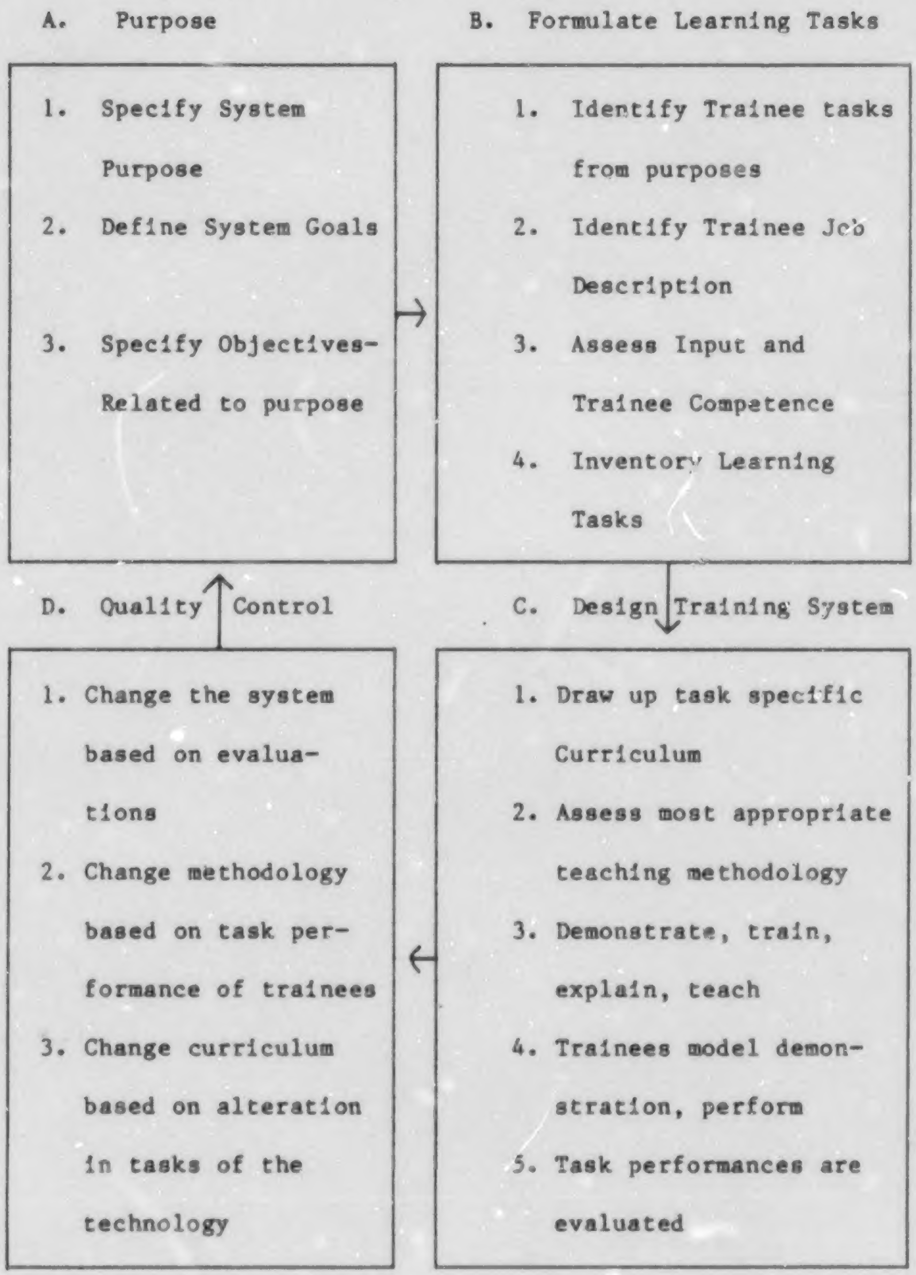
III. SUMMARY

The design of a training system for a technology such as irrigation water management, requires attention be given to developing a process which is logical, holistic, and contextual. System's thought requires a conscious process of reflection which is systematic in the sense that it is methodical, coherent, designed and analytic in nature. It is relational, that is, it accounts for references, connections, interconnections and cooperation particularly from all the representative disciplines, i.e., engineering, irrigation agronomy, rural sociology, and technical/vocational education.

What did all this mean to conference members in regard to On Farm Water Management training? It meant that the entire training program to be established would be related to "referents" of tasks to be performed by trainees, their job descriptions, their function in a larger inter-disciplinary system. It meant that trainers would plan curriculum together. Thinking this way reversed the usual curriculum development process which had begun with discipline experts listing what they thought trainees must know.

Figure 1

TECHNICAL TRAINING SYSTEMS MODEL



A. Purpose

1. Specify System Purpose
2. Define System Goals
3. Specify Objectives-Related to purpose

B. Formulate Learning Tasks

1. Identify Trainee tasks from purposes
2. Identify Trainee Job Description
3. Assess Input and Trainee Competence
4. Inventory Learning Tasks

C. Design Training System

1. Draw up task specific Curriculum
2. Assess most appropriate teaching methodology
3. Demonstrate, train, explain, teach
4. Trainees model demonstration, perform
5. Task performances are evaluated

D. Quality Control

1. Change the system based on evaluations
2. Change methodology based on task performance of trainees
3. Change curriculum based on alteration in tasks of the technology

The Systems Approach in Curriculum Development embarked upon by the conference required that initial reflection about the entire On Farm Water Management System, its process, structures and outcome had to be made by all cooperating agencies. Then the eductional system which was initiated would carry out training so that those who perform tasks for the On Farm Water Management would do so more effectively and more efficiently in future years.

During the two day conference many major concerns were discussed and important decisions reached. Recommendations for change were made (Bergsma, 1984).

IV. ON FARM WATER MANAGEMENT: RECOMMENDATIONS REGARDING THE TRAINING FUNCTION

A. Establish an "Overarching" Joint Planning Unit

There is a need for establishing a joint training and planning unit for OFWM training concerns nationally. Such a unit can help to systematize the development of a set curriculum for OFWM needs related to the level of tasks to be performed by trainers.

It is recommended:

1) That a Joint Planning Unit for Training (JPUT) be established which should consist of all the Provincial Directors or Assistant/Deputy Directors on On Farm Water Management.

2) This committee will act as a "Training Cell: and will have appropriate curriculum committees working under it.

3) It will also act as an "overarching" or linking unit for overseas training. It will collect and disseminate information in this respect and distribute it to the right quarters.

4) It will supply and distribute OFWM information to all libraries, including suitable currently available audio-visual aid material.

B. Initiate Inter-agency and Inter-disciplinary Co-ordination

There is a need to initiate inter-agency and inter-disciplinary co-ordination in regard to training programs, particularly in curriculum development. Such dialogue between agencies will enhance co-operation, prevent duplication of effort and provide for a reference base for curriculum development.

It is agreed:

That the World Bank, Asian Development Bank, FAO, USAID, or any other funding agency be invited to participate in the Joint Planning Unit.

C. Establish a Unified Curriculum

There is a need to establish a unified curriculum for use in all OFWM efforts at all institutes. On Farm Water Management concerns should be treated systematically in all training programs and efforts to regularize training should be made.

It was agreed:

1) There should be a Planning Sub-Committee whose first concern should begin Sub-professional level training needs.

   It was agreed that curriculum should be applicable to all levels of training, but should be directed to different levels of understanding and need related to the function of that level. The implementation of this Sub-Committee should be immediate.

2) There should be a Curriculum Committee of Training Heads whose job is to relate the curriculum to the job descriptions. This committee should comprise:

   - Directors of OFWM;
   - Deputy Directors of OFWM;
   - Representatives from the 3 universities of agriculture;
   - Representatives from OFWM Training Institute, Lahore.

3) Subject Committee of all disciplines should meet once to submit to the Curriculum Committee their syllabi on each subject. These committees would also review and submit the job descriptions.

4) The following 3 committees should therefore meet within one month:

- Engineering (Ch: Qurban Ali Awan)
- Irrigation Agronomy & Soil Science (Ch: Mumtaz Ali Awan)
- Sociology, Extension & Management (Ch: Mehar Jamal)

D. Establish a Standard Job Description

There is a need to establish a standard job description for all Field Assistants and Sub-Engineers related to On Farm Water Management Projects with a view to the development of job training for these people.

It was agreed:

That the Subject Committee should review the job descriptions of:

- Professionals and Trainers
- Sub-professionals
- Users of water

Its comments should be sent to the Curriculum Committee Chairman within one month as an Appendix. (See C above)

E. Establish Training Targets in a Systematic Fashion

There is a need to establish training targets in a systematic fashion based on unique needs of trainers. Trainees vary greatly. Some are Associate Directors, Managers, and others are Field Assistants. Curricula developed, should meet each group's specific vocational need.

It was agreed that:

The job of the Curriculum Committee is to sift information and pass it on to the JPUT. This information would come from the Provinces, their Projects and the funding Agencies.

F. Formulate a National Policy for OFWM Training

There is a need to formulate a national policy for Water Management Training and Curriculum which includes the unique needs of each of the Provinces, their climates, and agricultural environments. This point was dealt with under A and E above; the present Conference is being held for this very reason.

G. Assess the Effectiveness of Various Training Programs

There is a need to assess the effectiveness of various training programs, their built-in capabilities and the influence of these organizations. Institutes differ in their capacity, their function, and their faculties. Effective utilization of faculties will be enhanced through knowledge of differentiated function.

It was considered that:

This is directly related to the development of effective training programs.

H. Monitoring and Evaluation of OFWM Training

Monitoring and evaluation of OFWM Training needs to be continued and systematized. The evaluation procedures should reflect the ongoing status of all the Institutes' programs, and the level of skill attainment of various groups of trainees. Accurate information about the level of skill and vocational knowledge of trainees is a means to change existing training programs and curricula.

It was agreed that:

Monitoring and evaluation should be based on the pre-testing and post-testing of trainees, amongst other things. It was felt there should be an incentive system in the training and posting of trainees.

I. Strengthen Existing OFWM Training Programs

There is a need to strengthen existing On Farm Water Management Training Programs through regular upgrading of facilities, equipment and faculties. This process should be regularized as part of an operational systems approach.

It was emphasized that:

There is a need for more practical work. The curriculum to be established should be based on simple objectives; further, the technology contained in this curriculum must be continuously amended.

J. Overall Increased Emphasis on the Role of the Field Assistants in OFWM

Overall increase of the manpower force, of Field Assistants is needed nationally. Field assistants are the backbone of the work force for On Farm Water Management. A lack of such workers greatly weakens the system's ability to carry out OFWM objectives.

It was commented:

That this has been discussed at higher level and some progress has been made in securing people. However...

It was agreed that:

The urgent need is to have the existing personnel retrained.

V. CONCLUSION

The efforts to improve and coordinate training and curriculum development to enhance On Farm Water Management practices by providing more well trained people who are able to perform their tasks well has begun in earnest. Committees have worked hard and have recommended training needs. A National Curriculum Guide has recently been published by the Punjab Directorate of On Farm Water Management. Task specific training modules in Urdu and English have been written and published. Much dialogue has occurred between Training Consultants of the funding agencies. Plans to open new training institutes in Sind and North West Frontier Province are under-way, based on the work of the National Committee for Training and Curriculum Development. Assessments have been made for manpower needs and the training of a new cadre of trainers is presently a primary concern. Development education is a difficult and challenging task. It is encouraging that so much progress has been made in the area of training in On Farm Water Management in Pakistan.

Chapter Two

EVALUATING TRAINING PROGRAM NEEDS IN ON FARM WATER MANAGEMENT

I. USING A NEEDS ASSESSMENT SURVEY FOR CURRICULUM PLANNING AND PROGRAM CHANGE

Ideas for changes in curriculum and teaching frequently result from arbitrary decisions made by experts in discipline areas. Such decisions relate to the faculty expert's personal professional assessment of what knowledge students should have to do their work on water management field teams. Faculty who keep current with practitioner needs, who frequently visit water irrigation channel construction sites, who interview engineers, farmers and field workers gather appropriate data for decision making about curriculum development. On the other hand faculty who received training in a university setting which emphasized theoretical teaching, may tend to replicate similar teaching and develop curriculum which resembles university lecture notes. In the area of technical training, particularly in the complex field of water management where interdisciplinary approaches are important, particularly the development of skills among trainees, new approaches are necessary.

Few faculty take the time to evaluate carefully the needs of field teams, the actual job descriptions of the people they are training, the results of research emerging from universities, all of which are important considerations for curriculum development. For instance, a curriculum which is developed for training sub-engineers for work on water management field teams should consider:

- an accurate job description of the trainees when they begin their work, including a listing of major skill areas in which they should receive training.
- important theoretical concepts which underlie the applied skills
- knowledge of how much and how accurately trainees performed in their previous education and training experiences
- use and availability of equipment to be employed in on-the-job situations
- practitioners' statements who have experience in the field, regarding what worked for them and what did not.
- implications of current research related to the technical discipline.

The administration and faculty at the OFWM Institute at Lahore decided to approach the problem of how to develop curriculum by means of setting up assessment procedures. These were, first, to assist with a national needs assessment survey in On Farm Water Management related to training and curriculum and second, to develop concurrently accurate job descriptions for all levels of trainees ranging from agricultural extension field assistants, agronomists and engineer team supervisors.

These job descriptions were developed over a period of six months in the Punjab under the office of the Director General of On Farm Water Management. For the purposes of this document, these lengthy job descriptions are not presented, however, they were utilized directly by curriculum planning committees at later dates, particularly in the development of the national curriculum guide which appears in the next chapter.

The needs assessment survey, carried out by the author during late 1983 and early 1984 became a significant data base for decisions made for curriculum development during the national conference on training. Features of the systematic needs assessment were as follows:

A. Needs Assessment Process

1. Discussions were held with the Institute's faculty and its Director about the establishment of a systematic approach in curriculum development.
2. Meetings were held with various groups, such as farmer user associations, faculty of the Water Management, Research and Training Center at the University of Agriculture at Faisalabad, with field teams and Directors in the Faisalabad and Kasur areas and finally with twenty six participants in a special session devoted to specifying critical needs for consideration by the On Farm Water Management Training Institute. All these vested interest groups presented their practical

and field related suggestions for change and/or improvements.

3. Statements of need were analyzed and grouped. From these, "generic" needs statements were developed and refined.

B. Data Collection Process

1. A Transactional Evaluation needs assessment instrument was drawn up.
2. A random selection was made from names of past graduates of the institute in order to sample approximately 20% of the total group.
3. The instruments for evaluation were distributed and administered to field staff and administrators.

C. Data Analysis

1. Returned evaluations were sorted, data tabulated and analyzed.

D. Data Feedback

1. Results of the evaluation were printed in summary form and made available to field Directors, Institutes, and other provincial and federal administrators related to the Institute.

E. Data Use

1. Faculty of the Institute began work with high priority areas of need and began meetings to develop curriculum by objectives.

2. Meetings with faculty members in the Institute by subject area to be held in order to evaluate means of initiating curricular change and work on syllabi which reflect these changes.

II. THE NEEDS ASSESSMENT SURVEY: DISCUSSION OF RESULTS

Three separate needs assessments were made in November and December of 1983 related to curriculum development. Initially, eighty persons who had completed training courses at the Institute in Lahore were interviewed and requested to list what they considered to be important areas for curricular change based on their duties. From responses, fifty generic statements were developed to which trainees could again respond using a 1-5 scale for purposes of indicating the importance of each item, one being low, five, high.

A pilot group at Peshawar of 12 people filled the instrument (Interaction Analysis Survey) and scores were tabulated. A second version of the instrument was sent out to three hundred who had previously received training. This randomly selected group represented about one fifth of all past trainees. Only one third of this group responded. However, these one hundred responses were again tabulated and rank ordered. An Urdu letter of reminder was sent and a few more responded. A great many letters were returned through the postal system, indicating problems of reaching people at addresses provided.

The results which are summarized indicate concerns for change in curriculum and training at the On Farm Water Management Institute. These are being brought to the attention of the Administration and faculty as they revise their curriculum.

A. Assessment Objectives

The objectives for performing a needs assessment relating to the On Farm Water Management Training Institute are as follows:

1. To provide opportunity for past graduates of the Institute to assess the value of their own training to the jobs to which they have been assigned and provide feedback to trainers.
2. To pin-point areas of perceived need for changes in the curriculum at the Institute.
3. To create (cross-discipline) dialogue between faculty and trainees regarding ways to improve training.
4. To establish a rational base for curriculum evaluation and change.

B. Discussion Relating to Items Highly Scored

The information received from verbal interviews, the Pilot Assessment and the Field Assessment was similar in nature. Five of the highest ranked items appeared in all three groups' top ten selections. Figure 1 indicates the areas of highest concern of past graduates of the Institute and should be carefully considered by faculty in the future.

1. The four highest marked items relate to a need expressed by trainees to receive practical work in watercourse planning and construction. Perhaps too much "show and tell" has occured and a need is expressed for actually doing. Field officers and assistants should have more theoretical and actual practical ability than those they supervise. Too much classroom time does not serve this need well. The quality of the time used for practical field work should be considered. How much hands-on experience is each trainee receiving in surveying, levelling, construction, and measuring water flow?
2. An area of perceived need was the request for a "handbook" for field workers. An A.D.B. "Farm Management Plan" has already been produced to assist farmers and is being introduced in D.I. Khan areas. It would be advantageous to have such a Farm Management Plan and Monitoring Plan available for all field managers to use in conjunction with farmers. Additionally, basic information simplified for easy use, in Urdu, of watercourse construction, survey, water measurement and materials use would be helpful for field

managers and assistants alike, i.e., provide a reference base for operation.

3. There was high agreement that training materials in Urdu were needed for extension use. Faculty who have developed their teaching notes in English should systematically work at producing clear and simple outlines in Urdu to be published and handed out to field workers as reference material in Agricultural Economics, Agronomy, Agricultural Engineering (Surveying Watercourses/Land Levelling), Rural Sociology, etc.
4. One item which received high scores related to the need for the faculty to develop lesson plans and curriculum based on objectives. It is obvious that as faculty work on curriculum development based on understanding of the unique needs of specific groups of trainees, their education levels and their job requirements; that the focus of curriculum content will become sharper and the teaching approaches related more closely to content areas. As a technical training institute, much careful work is needed to develop teaching procedures which are practical, and which provide relevant hands-on experience to bolster theoretical information presented. As a systematic curriculum development process is established, many of the items of perceived need of trainees will fall into place. The Institute could

provide rational leadership in this area, i.e., the development of curriculum materials related to technical educational needs in On Farm Water Management.

5. Value of the "Needs Assessment" Process.

Monitoring and evaluating the On Farm Water Management Institute programs are important, particularly if specific areas of need for improvement are pin-pointed. This assessment has provided a beginning, that is, focusing work for change based on need. Faculty and administration are working to improve their programs and their training impact based on the assessment results reported in Figure 2.

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Insert Figure 2 About Here

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III. TESTING AND MEASUREMENT PROCEDURES

A commonly used approach to evaluate students' progress is for faculty to set a final paper or examination at the end of a two month duration course. Material from readings, lectures, and practical work are included in such a summative evaluation. If objectives for teaching were not carefully established prior to the two month course, final evaluations can frequently test for information recall that is rather arbitrary. Students tend to guess what the faculty will ask and cram accordingly.

Figure 2

ON FARM WATER MANAGEMENT TRAINING INSTITUTE;

NEEDS ASSESSMENT: RESULTS

RANK ORDER OF AVERAGE SCORES BASED ON 1-5 SCALE

Rank Order		Average Scale
1.	On Farm Water Management trainees should have practical demonstrations of the process of constructing a lined watercourse including materials preparation, setting and curing time.	4.56
2.	On Farm Water Management trainees should be involved in the measurement and calculation of materials for masonary work.	4.43
3.	On Farm Water Management trainees need to have more time and practical training in their curriculum regarding watercourse planning, construction and supervision.	4.37
3.	On Farm Water Management trainees should be shown how to install control devices such as checks, turn outs and drop structures.	4.37
4.	The Institute should print a handbook for field workers, students, which contains basic information used in the field such as standards, specifications, terms, etc.	4.31

Figure 2 Continued

5.	The Institute should develop training materials in Urdu for extension use.	4.12
6.	Faculty at the Institute should learn how to develop lesson plans and develop curriculum based on objectives.	4.00
6.	The Institute can have a role in helping students to become more responsible public servants.	4.00
6.	On Farm Water Management trainees need to know more ways of motivating farmers to develop improved watercourses.	4.00
6.	Training at the On Farm Water Management Training Institute should stress as much as fifty percent field oriented practical work during training.	4.00
6.	Field officers should be in to the Institute from time to time to present information to trainees based on their practical knowledge.	4.00
7.	The On Farm Water Management Training Institute should put more stress on the interdisciplinary approach in curriculum development.	3.99
8.	On Farm Water Management trainees should receive training in the technical maintenance of previously constructed watercourses.	3.93

Figure 2 Continued

8.	On Farm Water Management trainees should receive hands-on experience in constructing a culvert.	3.93
8.	On Farm Water Management trainees need to have improved practical training in irrigation agronomy and types of irrigation systems.	3.93
8.	Applicants to the On Farm Water Management Training Institute should be more carefully screened before being admitted for training.	3.93
9.	Field inspectors need to be trained in public relation skills, inspection methodology, and basic administrative skills.	3.87
10.	On Farm Water Management trainees need to have experience in dealing directly with the farmers.	3.81
10.	On Farm Water Management trainees should have more training in the Sociology of rural farmers in order to better understand how to deal with them.	3.81
10.	On Farm Water Management trainees should have as much basic construction knowledge as the masons they supervise, such as cement lining, curing time, use of materials, etc.	3.81
11.	Extension workers need better visual aids and teaching devices to help inform and motivate farmers.	3.75

Figure 2 Continued

11.	On Farm Water Management trainees need to work more in the field in practicums devoted to water course improvement.	3.75
11.	On Farm Water Management trainees should learn how to keep records and make reports related to their assignment.	3.75
12.	The On Farm Water Management Institute should present special prizes to the most excellent student/s in each group in order to create incentives to study harder.	3.68

Technical education requires a more systematic approach to testing evaluation. First, job descriptions are carefully written, task analyses are performed to determine skill levels needed, objectives are established to carry these out and, finally, the training program is established which aims directly at the objectives. In such a system the faculty member and students both know the objectives of the course and therefore evaluation or testing logically related to these objectives specifically, particularly in the attainment of skills.

A number of evaluation approaches were initiated at the OFWM Training Institute. Examinations based on theoretical lectures continued to be the most common made, however, faculty utilized a variety of other evaluations. First, they explored alternatives to lecturing and testing of memorized material. Thirteen alternative ways of teaching were explored:

- Teaching a skill through demonstration and student practice
- Teaching through use of visual aids to accompany oral presentations
- Teaching by having students look up material, summarize, and report it.
- Teaching through having problems presented to groups and having the groups come up with solutions
- Teaching through simulations such as the use of modules, the use of materials that resemble real life
- Teaching through questioning, "the Socratic method"

- Teaching through use of technical machinery, computers, calculators, scientific devices to perform tasks given by the instructor
- Teaching through field demonstrations and actual work in the field such as surveying, talking with WUA, farmer groups, etc.
- Teaching by means printed hand-outs on which lesson points are high-lighted
- Teaching through use of library reference books from which students must get material to answer questions set by the teacher
- Teaching through debate, where opposite sides present view point to convince others
- Teaching through field trips to observe specific operations previously discussed or learned
- Teaching through use of printed self instructional modules

All thirteen evaluation techniques will not be discussed in here, rather one or two examples will be used to high-light the process employed.

A. Task Specific Training and Evaluation

Faculty initially compared technical training approaches to theoretical educational approaches. Figure 3 presents a summary of this comparison.

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Insert Figure 3 About Here

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Figure 3

COMPARISON OF TRAINING APPROACHES IN ON FARM WATER MANAGEMENT

Technical Approaches	Theoretical Approaches
1. Teacher/farm manager reviews tasks to be done on watercourse and farms	1. Teacher/trainer provides background theoretical information, i.e., he tells about reality
2. Teacher/farm manager arranges for trainee (field team) practical learning sessions for the tasks	2. Lecture/trainer arranges curriculum and schedule of lectures
3. Trainees (field team) take part in demonstration of these tasks	3. Students listen to presentation
4. Trainees (field team) try out tasks for themselves, practice for improved skill	4. Students take a final test to see if they memorized the material

A. Technical/vocational training approaches are tied to the job/work of the persons who will be involved with a technology (i.e., OFWM - Watercourse construction, land levelling, surveying, working on farms using extension methods.

Figure 3 Continued

B. Technical/vocational training allows for trainees to try out new ways of doing things, encourages practice, rewards task performance.

C. Technical/vocational training approaches require that the trainer/manager understands the nature of the tasks, the job description of the field team workers.

D. Technical/vocational training requires that the trainer/manager have a good grasp of the theoretical concepts involved in his technology.

The next exercise was to establish an environment for evaluation of task specific skill learning. Seven steps were practices by the faculty (see Figure 4).

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Step VI of this process required that faculty score each student on the skills attained in the field. Evaluation of this nature is critical in the sense that when certification is given in water management technologies, one knows that specific tasks can be performed by the student at specific levels of accuracy.

The faculty developed evaluation sheets in each area of the various interdisciplinary programs including surveying, construction, water measurement, land levelling, management, and even how to approach farmers for crop improvement through better water management.

For purposes of this text, the Irrigation Agronomy student evaluation sheet is presented as below to indicate how faculty learned to evaluate individual skill performance (see Figure 5).

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Insert Figure 5 About Here

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Figure 4

SEVEN STEPS IN PRACTICAL TRAINING FOR INDIVIDUAL TASK COMPLETION

Teacher's Methodology

I. First Step (Preparation). Create interest among the trainees; name the task and describe its nature; correlate the task with the trainees' previous work; point out the importance of task; and check the position of each trainee.

II. Second Step (Presentation). Explain the main task; emphasize the key points and point out the reasons behind each; and check the trainee's level of understanding. Demonstrate the task by doing it.

III. Third Step (Exercise). Allow each trainee to perform the task; point out the safety and success derived from knowing how to do the task well; confirm the importance of the key points by demonstrating the reasons for them; and explain the task in more detail.

IV. Fourth Step (Summarization). Point out the important points of the task; distinguish between the correct and wrong ways of performing the task; make sure the trainees have understood the task well; and encourage questions from the trainees.

Figure 4 Continued

Students Demonstrate and Practice

V. Fifth Step. Trainees now perform the task demonstrating their skill to an instructor.

VI. Sixth Step. Trainees are evaluated and scored by the instructor.

VII. Seventh Step. Feedback (a) if the skill for the task has not been met, the Instructor again shows how and why the task is to be done (i.e., Step 4); and (b) students immediately know if they have been able to meet the task standard, are reinforced and motivated for task 2.

Figure 5

TASK SPECIFIC TRAINING IN IRRIGATION AGRONOMY

Task nature	Soil Texture Identification		Soil Structure Identification		Feel and Appearance Method		Use of Tensiometer		Irrigation Scheduling		How Much water to apply		Water Budgeting	
Time allotted	Group - 10 Minutes		Individual-2 Min		Individual-10 Min		Individual-5 Min		Individual 10 Min		Individual-20 Min		Group-30 Min	
Name of the student	Date Completed	Skill Level	Date	Level	Date	Level	Date	Level	Date	Level	Date	Level	Date	Level

B. Using Pre-test/Post-test Evaluations

Many students come to the technical training institute with substantial knowledge in one field or another. In many cases, classes are not homogeneous, rather, a great variety of skill and knowledge difference exists among students.

In order to help faculty understand how to develop curriculum relevant to student needs, a pre-test/post-test system was introduced. The essence of this system was that each faculty spent a great deal of time going over the curriculum guide in his technical field and noting all important areas to be learned by students. In some cases a list of more than one hundred items was developed. Faculty were then asked to set an examination related specifically to these items. This test was reviewed by other faculty and administrators for appropriateness of questions, wording, and in order to remove duplication with other faculty.

This process was very helpful in developing an interdisciplinary approach to teaching water management. Many faculty saw for the first time how their course related to the "big picture." Needless to say many discussion occurred about how to improve the curriculum.

Finally, a pre-test was devised. As each wave of students arrived every two months or so, they were given the pre-test. Comparisons were able to be made between entering groups. Data collected became available as a means to eliminate test items or change these. In Figure 6 is an actual discussion of a pre-test presented at a faculty meeting.

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Insert Figure 6 About Here

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Faculty were resistant to giving students the same test after two months, primarily because they believed that it was almost like cheating to tip off the students at the beginning, i.e., providing them with overall learning objectives. Secondly, faculty predicted that students would pay attention to those aspects of the lectures and readings set out in the pre-test and thus reduce the difference between the tests of the very bright and the poor student since all would know what to study. Thirdly, faculty were not eager to be "forced" to stick to the objectives on which the pre-test was set as it in some way would reflect back on them if students did not do well in a given area. In Pakistan, in the examination system set for the universities, final examinations are set by faculty unknown to students, and evaluated by blind evaluators as well. This protects faculty from irate students who complain that material on the examination was never covered by certain faculty in some institutions. The pre-test system on the other hand tells what will be emphasized and students will expect faculty to teach toward these objectives.

Figure 6

DISCUSSION OF PRE-TEST/POST-TEST

Pre-Test

1. Scores for the English paper are such that by guesswork alone, students should have been able to achieve what was achieved, i.e., an overall 4.52/10 Scoring Mean. Conclusion, English level for these simple questions was too high for comprehension and therefore the exercise only proved that instruction and evaluation must be in Urdu for meaningful learning to occur.
2. Scores for the Urdu paper indicate a minimum understanding of concepts evaluated, i.e., 6.65 overall average. This indicates a need for the training in On Farm Water Management.
3. An evaluation of Scores received on the four papers indicates:
    A. The paper on Agricultural Engineering scored an average 9.10 by students. This could mean two things: 1) students know a fair amount of basic watercourse construction principles; and 2) instruction was simple and rundimentary for this level of student and could be answered by using basic logic.
    B. The paper on Agronomy scored 6.11 average, below the overall means of 6.65. This may indicate lack of knowledge about Agronomy at the on-set of the course and need for additional learning.

Figure 6 Continued

C. The paper on Agri/Economics scored an average 4.10. This may indicate:

   1. The material was unknown to the students and therefore a real need for instruction to the students.
   2. The test questions had little meaning for the students in Urdu or English.

D. The paper on Water user Associations received an average score of 7.5, slightly above the 6.65 mean. This indicates some need for training or that the questions were fairly common sense in nature.

The post-test results were most interesting. The greatest gain shown was in the area of Agricultural Economics, a subject the students who were sub-engineers had almost no knowledge of when they arrived. The least gain was in Agricultural Engineering. Figure 7 is a discussion sheet drawn up for a faculty meeting.

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Insert Figure 7 About Here

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In summary, faculty worked on improving their testing and evaluation procedures. The experience for many was not all pleasant since it involved change; change of method and approach to learning. It is believed, however, that technical training requires specific attention be paid to evaluation techniques which are more than the learn, regurgitate information system.

In addition, mention has not been made of institutional program evaluation which is an important part of a technical institution building process. Monitoring and evaluation of teaching and curriculum development is frequently poorly performed and receives little emphasis in most funded projects, including those in On Farm Water Management. In many cases, ratings are based on students' opinions of the program alone. Many other evaluation techniques could be utilized including instruments to check on actual skills

Figure 7

DISCUSSION OF PRE-TEST/POST-TEST

Post-test

The training during one month created an overall gain of 1.62 on the 1-5 scale, i.e., a 32% increase by the students. This is encouraging, learning occurred.

Paper #1 Agri/Engineering

The total gain here was only .35, a very minimal showing. Perhaps the questions were too simplistic on the pre-test. Or, perhaps the material itself was well known when the students arrived before training. Whatever the cause this area needs to be looked at for the next class. Let's see if we can write more representative questions regarding Agri/Engineering.

Paper #2 Agron/Irrigation

There was a gain of 1.71 compared to the 1.62 overall gain. This indicates students learned well and performed better when they completed the course.

Paper #3 Agri/Econ

Here there was a huge gain, i.e., 69% over the pre-test. This may mean the pre-test was unknown to them and they learned much during the course, particularly terminology.

Figure 7 Continued

Paper #4 W.U. Associations

A gain of .96 indicates some information was learned, about 18% over initial entry. Some concern here.

Overall, the total marks indicate students did much better after the course. Initally the score was 23/40 (57%). After the course 33/40 (82%). The teachers at the Institute should be pleased at these results. It would be interesting to see how the final examinations you set, turn out. Unfortunately, since these were not given as pre-tests no gains will be noted, only percentages relating to the tests themselves.

May I suggest that the content of the final examinations you gave be made into 50 short answer questions for each area in Urdu, and given to the students on arrival. If these cannot be developed in time, use the same Urdu post-test as your pre-test for class comparison purposes.

learned, reports from supervisors of graduates, institutional studies, assessment of curriculum based on objectives, assessment of time, and effort studies and many more (Bergsma, H., 1984a).

Chapter Three

ESTABLISHING INTERDISCIPLINARY PROGRAM OBJECTIVES IN ON FARM WATER MANAGEMENT

> "There must also be wide agreement that training is a prime means of achieving improvements in water management. While some form of education and training in water management may be available, there is a great need in most countries to take fresh initiatives to improve existing courses and establish new training programs, if present and future manpower requirements are to be met."
>
> (F.A.O. Report, 1982)

I. INTRODUCTION

The Food and Agriculture Organization of the United Nations meeting held in Rome in 1982, discussed various aspects of training related to water management and outlined many excellent suggestions for change. One message which emerged repeatedly during the meeting was that systematic approaches to water management training were fairly new, however, as these are developed they will become key factors to improve water management by way of augmenting the generalized education received in universities in various disciplines. Such program development should ideally occur within each country and be uniquely adapted to the local situation and supporting training and education provided by other local institutions. The conference envisioned program development in water management training which would be based on objectives set by those involved with establishing training programs. Because of the nature of water management, that is, involving engineers, economists, agronomists, sociologists, and educators, the setting of objectives would involve multidisciplinary inputs. More, it would require an interdisciplinary approach in order to create a unified training program.

Institutions embarking upon the establishment of objectives and curriculum development based on these, must realistically allow for ample time for this to occur. Additionally, the dialogue required for interdisciplinary sharing will need to be carefully monitored and supervised to keep faculty on task and on target. The breakdown in establishing institutional training objectives frequently occurs because of the lack of leadership and management skills of those in charge. Certainly, if the chief lecturer or institute director can be centrally involved there will be greater gains and a more cohesive program established.

Setting of objectives requires serious attention of all faculty and administration. If a whole-hearted effort cannot be exerted, little will be accomplished except frustration, delays, and lack of coordination. Positively, faculty committees for setting objectives should receive total support of the administration including attendance by chief directors. Time slots allocated to these development meetings should be "prime-time," rather than left over portions of the day or week. Scheduled meetings should be regular and attendance required. Setting objectives is tough work, requiring patience and skill.

In harmony with the case study approach utilized in this document, a faculty workshop training module which was actually utilized in the OFWM Training Instutute, Lahore, in 1984 is presented as one approach which could be used elsewhere to involve faculty in water management training. The workshop presented below was designed to help faculty focus on the structure and the process of setting objectives. The vehicle was rural sociology, related to working with farmer water user groups. The target groups to be trained were field assistants and sub-engineers who had approximately two years of training beyond the secondary level in an applied engineering program leading to sub-engineer (paraprofessional) status, or to agricultural assistant level. Each faculty member developed a set of objectives in his discipline area, after the workshop was completed.

II. INTERDISCIPLINARY FACULTY WORKSHOP/S ESTABLISH OBJECTIVES FOR SYSTEMATIC CURRICULUM DEVELOPMENT

A. Workshop Outline: Steps to be Taken (1-7)

1. Step One

Ask yourself about your audience, its level, needs, and job requirements. Ask about their job description. Why are they taking this course? Know your audience before you begin. Review the pre-test scores for each student.

2. Step Two

Write an occupational description of your class and what they will do when they complete training. Meet with your students and discuss how training will help them in their field assignments, in areas where they lack skill or information.

3. Step Three

How will your teaching relate to:

a. Job specific skills

b. Communication skills

c. Working with groups and water user associations

d. The transfer of technology process (i.e., extension methdology--current information)

e. Student needs

4. Step Four

What are the major teaching goals for the short course in your specific discipline (i.e., agronomy, engineering, etc.)

5. Step Five

How long will it take you to do this teaching job

6. Step Six

Set up student objectives

7. Step Seven

Set up your introductory lecture. How will you create "arousal" or interest for your subject?

B. Discussion of Steps Taken

The teacher is the professional who knows subject matter and who is responsible for presenting subject matter to students appropriately, that is, based on the unique features of his discipline and on the unique needs of his students. Students who have had little training, students whose work is basically practical in nature, will require a curriculum which is basic, practical, and fundamental. Students with degrees, students who are already experienced managers of farms will need a curriculum that is more theoretical and applied in nature to match their managerial task.

It is up to the teacher to ensure that the curriculum is relevant, appropriate, and factual. (See Appendix A for developing objectives at different levels.)

1. Step One

The teacher must ask, "Who is my audience?" "What is their academic level?" "What background, if any, do they have in my discipline (i.e., sociology)?" "What job are they assigned to do?" "How will my training help them carry out this job?" "Have I seen a 'Job Description' of these people?"

Faculty discussed the answers to these questions. It was found that over-lapping of job responsibilities occurred. Decisions were made to eliminate curriculum duplication.

2. Step Two

Carefully describe the student audience you will teach. An example is provided here:

Example description:

> My students are field assistants, and sub-engineers who will work directly under the field engineer. They will help to construct watercourses, work with farmers in establishment of Water User Association groups, they will train farmers in appropriate methods to maintain new watercourses. They will supervise laborers and keep records of materials ordered and used during construction, and they will use survey instruments to check on accuracy of contractors' construction levels.

3. Step Three

In rural sociology and management, four major areas of curriculum development need to be considered. (Other disciplines will consider these also and develop a similar list of what students should know and do.)

a. Job-specific Skills to Improve Work Efficiency

    1. Students should know about society, culture, and strategies that can be used to induce change.
    2. Students should develop an awareness of social communication problems, should have their consciousness raised about how one deals with adults in planned ways.
    3. Students should understand that society has an economic base which is affected by culture (Cognitive domain).

    Field Assistants will work to organize, convince, plan, and work with social groups and be part of a team effort in the field.

b. Communication Skills with People; Professionals, Farmers, etc.

    1. Students should know how to organize and direct field labor and apply appropriate management techniques.
    2. Students should learn how to resolve disputes and be impartial problem solvers.

3. Students should learn how to direct a watercourse maintenance program and use the training received in motivation and change theory.

c. Methodology and Rationale for Working with Groups & Organizations, i.e., Water User Associations, etc.

1. Students should know how to set up committees.
2. Students should know how to keep committee minutes and records.
3. Students should be able to advise on how best to keep records of money and how to set up a group treasury system.
4. Students should be able to explain basic legal aspects of Water User Association regulations.
5. Students should be able to set up maintenance records.

d. Technology Transfer. How Professional Concepts and Technical Information are Made Meaningful to People in the Field

1. Students must know how innovation occurs. Why it does not occur, and what are barriers to such transfer.
2. Students must understand that technical assistance frequently violates religious social and honor (izzat) beliefs.

4. Step Four

What are your major teaching goals?

a. To define and illustrate basic social science and management concepts.

b. To use these concepts to develop a perspective for understanding the role of social, cultural, and economic factors in programs of planned change.

c. To show the significance of social/cultural factors for the success of a program to improve water management, and the need for a change agent (extension officer, or sub-engineer) to take these factors into account.

d. To prepare trainees for organizing watercourse committees: procedures, strategies, pitfalls to avoid.

e. To provide trainees experience in organizing farmers for a cleaning and maintenance program for watercourses.

5. Step Five

How long will it take me (the teacher) to introduce and reinforce these ideas with my students?

a. Lecture-discussion and brief evaluation of homework assignments.

2 hours

b. Classroom workshop to use principles of problem solving - Quiz

2 hours

c. Class lectures on management principles, discussion.

2 hours

d. Field tour to demonstrate an operative Water User Association (WUA) and to hold discussions with experienced field workers who have helped farmers keep records.

3 hours

e. Simulation class activity, role playing farmers and field teams

2 hours

Total: 11 hours

6. Step Six

Setting up Student Objectives:

a. All students will listen to a lecture on basic social science concepts, take notes, write three questions on paper about these notes. These will be used to ask the teacher questions in the discussion session and to help participation during discussion for a one hour period.

Students will answer the questions provided for homework in writing with complete accuracy during a one hour study period.

b. Students will listen to an hour lecture about social/cultural change. Students will participate in a one hour cultural workshop during which a change idea is introduced and a change agent brings innovation. Students will write what they learned at the end of the workshop and turn these in to the teacher.

c. Students will participate in a field trip to a farm area and listen to discussions by farmers and the teacher, ask questions during these discussions, jot down their observations and ideas for later use in class during a three hour period.

d. Students will listen to a half hour lecture and complete a workbook assignment prepared by the teacher during a one and a half hour period.

e. Students will simulate a social situation in class and establish with a "Water User" group. Students will record what happens during this session.

Students will discuss the success or lack of success of the simulation and how it could be improved during a 1 hour period.

Students will take a test on the basic information presented in a-e.

NOTE: An alternative set of student objectives is presented in Appendix C of this chapter.

7. Step Seven

Faculty members develop lecture notes related to the concepts developed and/or presented. These are shared with each other in seminars. One example is presented below:

Example of Lecture Preparation Notes

Introductoral Remarks:

Increasing agricultural production through improving water management practices is not simply a technical problem; it is also a social problem. (Show slides of WUA from India, Pakistan, and Egypt.)

The Social Problem:

1. Organizing farmers for working together on rehabilitation and maintenance of their watercourse is difficult because of problems relating to caste, honor, farm size, location on the watercourse.
2. Educating farmers or changing their perceptions to make them more receptive to new ideas, and teaching them new techniques that will help them increase production income means they must be convinced and cooperate. Since this problem is social as well as technical, training in a

purely technical skill area will not prepare you for your job. You also need:

a. A clear understanding of social structure and how rural farmers interact.

b. A clear understanding of social/cultural constraints on behavior.

c. Knowledge about social skills and strategies that can be used to induce change.

Learning these will be a continuous process on the job; the purpose of the "rural sociology" part of your training is to orient you to these problems, raise your consciousness of social/cultural factors, and give you the basic background to build on when you begin working at your jobs (management principles).

C. Helping Faculty Prepare Lectures

1. Preparing the Major Content of the Lecture—Example One

Basic ideas to present will be two fundamental concepts of social science which are the concepts of society and culture.

By "society" is meant the total system of social relationships. Notice the word system: since a society is a system it means there is a pattern or structure to it, just as there is a structure in material things. And just as material things differ, because of the different *relationship*, *structures* (different patterns of relationship among a limited number of elements), societies also differ primarily because of different patterns of relationship among the constituents--different structures. One difference between Pakistani and American society is in the structure of relationship that constitute the "family." For example, in Pakistan, a father has more authority over his wife and children than in America, but unlike America, *his* father continues to have authority over him even after his marriage.

By "culture" is meant the system of values, beliefs, rules, perceptions, attitudes, etc., that are in people's minds, and when people behave, and interpret other people's behavior. Culture is *learned* from childhood as people grow up, it is learned in a *social* context--one learns one's culture from family members, relatives, playmates, teachers, available artifacts as one is growing up. Most of this learning is *unconscious*, just like learning a language is unconscious. Language is part of culture; and just as you learn your language by imitating adults and having them respond to you when you make understandable noises, so you learn most of your culture by this same unconscious process. Because one learns about culture in a social context, people in the same society share their culture to a large extent. The degree of sharing varies with degree of social contact and similarity of the social context. People in one family will share more values, beliefs, etc., than persons from different families, and people from rural farmer families in the Punjab share more with each other than with people from other Punjab cities even though they are in the same "society." Lack of sharing, such as with Punjabi people in India, creates misunderstanding and bias.

Unconscious facets of culture are more important in determining people behavior than those facets which are conscious and public. For example, the principles of Islam taught by the Holy Quran are shared at a conscious level by most Pakistanis, but that does not mean these principles guide and determine behavior in the way we may wish, rather they provide a set of principles by which we often measure and evaluate behavior. The Holy Quran sets ideals which people may or may not live up to, but does not determine people's actual behavior socially.

Summary (question class about the main points). Sum Up; society is a system of social relationships;

these have patterns and structures. Culture is the set of beliefs, rules, values, attitudes, etc., which people learn in a social context; it is to a large degree share and unconscious, bias and misunderstanding increase when communication ceases. Use overhead projector slide for review.

- - - - - - - - - - - - - - - -

Insert Figure 8 About Here

- - - - - - - - - - - - - - - -

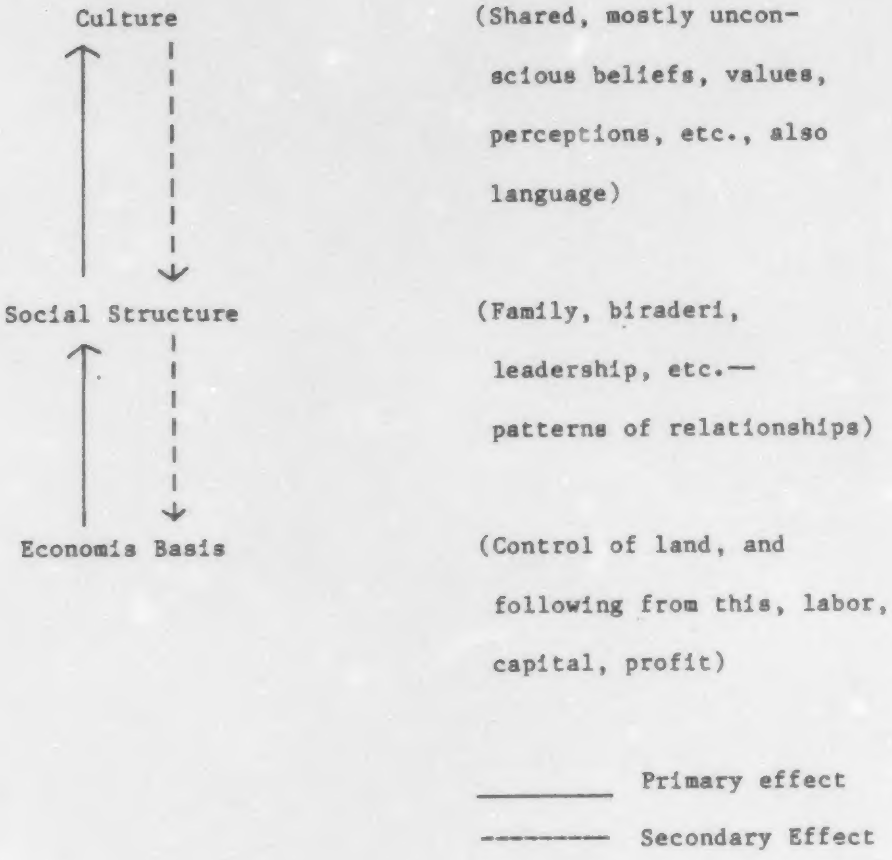
Application: Summarize your ideas. The perspective presented here has important implications for the success of the water management project. One implication is that a farmer's behavior is the result of the social and economic position in which he finds himself—his position in the social structure. In a community where a few farmers have more land than all others, for example, the leadership, or at least the ability to prevent others from being effective leaders, will usually be in the hands of these powerful few. This means you must work with them and get their support in order to be successful.

Another implication is that a change agent must be consciously aware of both the socio-economic structure (land holding patterns, groups such as biraderis, families) and also the culture of the community. For

Figure 8

EXAMPLE OF AN OVERHEAD SLIDE USED DURING THE LECTURE

Model of Sociocultural System



Culture

(Shared, mostly unconscious beliefs, values, perceptions, etc., also language)

Social Structure

(Family, biraderi, leadership, etc.— patterns of relationships)

Economis Basis

(Control of land, and following from this, labor, capital, profit)

________ Primary effect

-------- Secondary Effect

example, a primary cultural value that will affect the success of any cooperative project is _izzat_ (honor, prestige, reputation). (Class will discuss implications of _izzat_ for On Farm Water Management field workers during the summary discussion session.)

Make up a quiz or test to see if students meet objectives in Step 6. (See Appendix B for Alternate Student Objectives.)

2. How to Work with WUA's--Example of Lecture Two

a. Introduction

The major reason why watercourses need to be rebuilt is their poor maintenance in past. This poor maintenance is the direct result of inadequate social mechanisms to ensure that maintenance is carried out regularly and that all do their share of the maintenance. Therefore, improving water management is as much organization and institution-building as it is physical reconstruction.

Experience shows that reconstruction without effective organization will not pay off in increased agricultural production and incomes.

b. Strategies to Establish WUA's

According to On Farm Water Management rules, the farmers must organize a watercourse committee before their watercourse can be improved. The responsibilities of this committee are to:

1. organize and direct the labor of the farmers
2. resolve disputes among farmers arising from the improvement process
3. be responsible for water rescheduling, if necessary, during reconstruction
4. determine work assessment per land holding
5. act as the spokesman for the farmers in relation to the On Farm Water Management department
6. establish and direct a watercourse maintenance program after reconstruction

It has been observed that sometimes these committees exist only on paper and do not fulfill these minimal obligations. This de-emphasis on the committees and on the farmers' roles and responsibilities in the project is an error in the long run: if the farmers do not have a significant role and investment of their time (and money), they are less likely to maintain it in the long run. The committee system is not and never can be as effective as legal Water User Associations. You should, however, make the best of the present situation by trying to encourage the establishment of effective committees, and then work with the committee actively to keep it operating for maintaining the watercourse. Unless you keep working with the committee as a committee (and not with the individual member as particular leaders) after reconstruction, the committee will not carry out its maintenance responsibility. Remember, you are working with the committee and more generally the farmers; you are not directing or bossing them. You facilitate idea exchange, help keep meetings orderly and on target.

The above steps apply specifically to a watercourse that is to be reconstructed; but the same steps apply to a cleaning and maintenance program, whether on a previously improved, or unimproved, watercourse.

c. Suggestions for Dealing with Different Types of Watercourses

1. Watercourse with one large owner and many small farmers dependent on him: on this type of watercourse, you cannot succeed without the support of the big owner; the more actively he supports it, generally the better the success.

   Nevertheless, some of the other farmers should be involved as much as possible so they will not come to think of the project as the government's or the big owner's. If the small farmers are, in fact, tenants of the big owner, and not owners themselves (such as is often found in Sind), the watercourse may be ineligible for improvement under OFWM rules.

2. Watercourse with several competing big owners (and others as dependents on these): on such a watercourse, the question is whether the big owners can forgo their competition for their mutual benefit, or whether they are so competitive that the watercourse project will be turned into another arena for their competition. If they cannot cooperate, such a watercourse should not be chosen.
3. Watercourse with relatively equal land holdings, and mostly of a viable size: this type of watercourse is potentially the most promising for maintenance programs which have been surveyed by trainees. Not only should one day be allotted, but several evenings should be devoted to organizing watercourse committees on these watercourses in preparation for cleaning and maintenance. This cleaning and maintenance should then follow the period of organizing committees closely.

d. Setting up a Simulation in Class

1. Two people are to act as field assistants.
2. Class is divided into two groups of "Water User Associations."
3. Each Field Assistant is to prepare an outline on how he will deal with Water User Association farmers.
4. Students carry out simulation for one hour, some acting as farmers, others as field assistants of the OFWM program.
5. They record their findings/report back in class with teacher's assistance.

e. Developing a Quiz on the Lecture and Simulation

Example: Question 1. What are the three most important problems one encounters in organizing a committee on a watercourse?

Example: Question 2. List six responsibilities of WUA committees.

What visual aids or materials will be used? Chalk board, printed hand-out, overhead slides, slide projector.

f. What have I learned as Teacher?

Teacher now restructures his class preparing for the next session.

1. What worked?

2. What did the quiz reveal?
3. Was the time allotted sufficient?
4. Were my test questions based on the objectives?
5. Could I use better visual aides?
6. Was the level of instruction appropriate for my students?

g. Reading Material for Lecture Preparation

1. Review the material in Appendix A & B before revising your second lectures.
2. Some material for this lecture preparation was adapted from the Agricultural Officer Training Course for On Farm Water Management, University of Faisalabad, March, 1980 (Rural Sociology Section).
3. Special Study: Read, "Institutional Development: The Concept of Water User Associations," in the reference listed above for important background information.
4. See also "Economic Evaluation," page 336-338, On Farm Water Management Field Manual, Volume I, December, 1980, for other background information.

Appendix A

OBJECTIVES AND METHODOLOGIES OF TRAINING PROGRAMS FOR DIFFERENT LEVELS

Level/Group	To Achieve	Methods
Policy Level	Awareness and understanding of the need for improved farm water management; water management policy analysis; organizational requirements; management skills needed; solving interorganizational problems	Tours, workshops, short courses, non-technical briefs, video courses, etc.
Professional Level (a) academic* degree course	Water management theory & methods interdisciplinary teamwork; use of farmers' wisdom in all aspects of irrigation development or improvement; understanding of key concepts of the disciplines; field experience	Lectures, seminars, field trips, video
(b) non-acad. degree training	Upgrade water management knowledge; cross-discipline experience; training more farm-action oriented "how to do" skills; data analysis inter-	Seminars and workshops, "live" field work, video

	pretation and synthesis; program implementation, technology transfer, working with farmers	courses
(c) Sub-profes. and vocational level	Job-specific skills for improved performance; conflict resolution; communication with professionals and farmers; understanding methods and approaches of professionals	"Live" field work
(d) Farmers	Plant-water soil relationships farmer organization; how to obtain services; water control; farmers' roles and responsibilities; communication with irrigation agencies	Demonstrations, trials, media, group meetings, etc.

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*It has been assumed that universities provide discipline training (engineering, agronomy, economy, sociology, etc.) at the BA and BSc levels.

Source: Report on the Expert Consultation on Training in Water Management, Food and Agriculture Organization of the United Nations, September, 1982, Rome.

Appendix B

WORKSHOP: CURRICULUM MANAGEMENT SYSTEM FOR ON FARM WATER MANAGEMENT TRAINING PROGRAMS

Contents:

A. Intended outcomes to be considered

B. Academic content areas to be taught

C. Instructional time required

D. Instructional methdology

E. Evaluation and testing

F. Revision in the program (Feedback Loop)

CURRICULUM MANAGEMENT CHECK LIST FOR ON FARM WATER MANAGEMENT PROGRAMS

Concept:

Each training program within an institute should be examined separately with a view to understanding the unique features of the program (such as land levelling, irrigation, water management, agronomy, etc.) in regard to:

A. Intended outcome such as "The major outcomes we expect from this program are that trainees should be able to perform the tasks of land levelling such as manipulating the tractor, using the level accurately, etc., and supervising others in these tasks affectively."

Write four or five main outcomes for the area for which you have teaching responsibility.

B. Academic Content Areas to be Taught — Such as:

Nature of soils and related water use implications, water flow and measurement, physical structures in watercourse construction, etc.

Write an accurate listing of the content areas which will need to be included in order to meet intended outcomes in A. above. No items should be listed that do not relate to A. If you see a lack in A. at this point, revise your outcomes first, then proceed to list the academic content areas.

C. Instructional Time Required

Review A. and B. above and note how long you think each content area will require. For example, land levelling: four days in the classroom (10 hours of instruction time), four days in the field for practical work for 10 people maximum.

For each item in B., list instruction time in hours and practical work in hours.

Land levelling instruction = 10 field, 10 classroom

Grand Total Teaching Time

Grant Total Work Time

D. Methodology to be Used for Instruction in C.

Each teaching concept will require methods for teaching which best facilitate the time to be used and the content to be taught. For instance, use of the land level: students should listen to a 1/2 hour lecture on the parts, function, and care of the levelling device. Students will label the parts on a diagram of the level and write the function of each part with 85% accuracy. Students will demonstrate they can use the level, rod, etc., by matching previously established readings, etc.

Look at B. for each content area. List the types of methodology in training most appropriate to the content area.

E. Evaluation and Testing

Unless we know how well students grasp new information and how well they can perform newly learned tasks our training is "blind." We assume that by sitting in a lecture something happens. We really do not now unless we check their progress through systematic evaluation.

For example, students can label a blank chart accurately with only a 15% margin of error; or students demonstrate that they can use a level 100% accurately on a given plot where benchmarks were pre-determined by the instructor. Or, students will be tested on information presented in a lecture and recall 90% of the material.

F. Revision of A - E

It is noted that the instructor over-estimated the time needed to teach a given concept, such as checking water flow in the cu secs. Now he can revise the C. chart and reduce the lecture/instruction time and add time for the field measurement phase requiring students to check three parts of the watercourse. (Mark the revision in red ink on the previous charts A - 7).

Items that need revision.

B. 14. Less time on lecture, more on interactive task oriented problem solving.

Appendix C

STUDENT OBJECTIVES FOR FIELD ASSISTANTS TRAINING CLASS: WATER MANAGEMENT EXTENSION THROUGH WATER USER ASSOCIATIONS

1. a. Students will listen to a lecture related to watercourse improvement in rural social settings for 1/2 hour.
   b. Students will take part in a discussion led by the teacher to identify solutions to the problems related to watercourse improvement for one hour.
   c. Students will write down the major conclusion of the discussion session and return these to the teacher for evaluation.
2. Students will listen to a lecture on Need and Objectives of the "Water Users Association Act" for one hour, take notes, write two questions about its importance, and ask the teacher questions during 1/2 hour discussion session.
3. a. Students will listen to a lecture about the Water Users Association Act for 45 minutes.
   b. Students will read information about the WUA Act and take notes of important points.
   c. Students will write answers to questions about "Act" given by the teacher with 90% accuracy.
4. Students will read printed notes on rules and by laws of WUA for 15 minutes, listen to lecture for one hour, take notes,

participate in discussion for 45 minutes and answer any questions about working, rules and by laws with complete accuracy.

5. Students will participate in a field trip to meet with an executive committee of a watercourse project (8 hours). The sub-objectives will be:

    a. To discuss how the WUA works

    b. To find out about how the WUA keeps records

    c. To find out what maintenance program is in place

    d. To record these findings and submit these in writing to the teacher for evaluation.

Chapter Four

DEVELOPING A CURRICULUM GUIDE

I. INTRODUCTION

In the previous chapter, an example of one way to develop objectives for teaching was presented. Faculty have two sets of referents in developing curriculum, one being the state-of-the-art information in their disciplines such as in water measurement, irrigation agronomy. This referent is a continually changing one since new ideas emerge from research in industry and the university. Training of trainers in OFWM requires that experts in all the disciplines who are members of consulting teams provide seminars to up-date these trainers who tend to become removed from research findings. This point needs emphasis. Frequently, team members from funding agencies do not see themselves as "trainers" in their consulting roles. Yet, these consulting experts have the most current state-of-the-art information at their fingertips and are looked upon as an available source for up-dating trainers or faculty. As new projects are designed in irrigation and water management, efforts should be made to include training as part of their position descriptions.

Sending faculty or trainers abroad for training is expensive and frequently when faculty return they find new employment and transfer out. Training, even of a short term nature, provided on a regular basis in an interdisciplinary framework in country to trainers or faculty is an excellent way to refresh curriculum content.

The second referent available to faculty who are designing their curriculum is a statement of agreement from their peers in water management or irrigation about what should be included in a curriculum to meet work needs of team members constructing water courses and working with farmers.

An attempt was made to provide a vehicle to include both referents so that faculty would readily turn to a source or guide as they developed their lectures.

Previously, a systematic approach has been mentioned in regard to the curriculum development process. Part of such a system is a compilation of a Curriculum Guide.

In order to help faculty understand the process of developing a curriculum guide (CG), seminars were held and a sample CG was developed as a case in point. This CG is presented as one way of developing an outline or guide for lesson planning.

II. A CURRICULUM GUIDE IN FARMER TRAINING ON FARM WATER MANAGEMENT

A. Discussion

Water management implies that once the water leaves the watercourses and goes to the field of the farmer, that this water will be used with a minimum of wastage, that when the water is applied to the fields it will be done so efficiently, on levelled land properly formed, that the water schedules which are utilized will be planned with the specific requirements of the crops in mind and with the soil conditions in mind. Also, management implies that knowledge of up-to-date farming methods are employed, such as the use of correct seeds, fertilizer, and pesticides. Additionally, management implies that records are kept and crop production data is maintained so that farmers understand how they will meet their production targets and how their planning will result in improved crop production.

Farmers as a term means many things. Some farmers are well educated business men who keep current with modern agricultural technology and apply scientific means to improve crops. Some farmers are unable to read and are highly conservative and traditional and resist innovation and change. Some farmers own very small holdings of below 12.5 acres. Others own or manage large farms. Some farmers are tenents, others own their fields. Because of the tremendous range of backgrounds among farmers it becomes a difficult job to design training programs which will reach them all effectively. The vast majority of farm holdings in the Punjab are under 25 acres in size, comprising 1,043,893 farmers. It is to this group that this curriculum is primarily addressed.

The type of education farmers should receive should be simple, practical, applied in nature, non-theoretical, rather using the demonstration way which shows actual results, should be reinforced by means of printed material and simple visual aids, charts, diagrams, etc. In future years, it may be possible to enhance rural farmer education by means of using VTR and well produced video cassettes to provide information in an appealing and effective way. Much can now be done using simple demonstrations and printed material.

The curriculum envisioned here is broad and generic. Its aim to make the farmer a more effective producer through use of improved agricultural and water management principles.

B. Basic Goals

The basic goals behind all farmer education are to improve crop production and therefore improve farmers' incomes, and to conserve vital natural resources, particularly water.

C. Objectives for the Farmer's Training Program

Field teams will contact individual farmers and groups of farmers and provide information to them formally and informally in the following areas:

1. Farm Management Plan.

   Farmers should receive such a plan in a language they can understand and be taught how to fill in the information and to keep their copy of the plan for purposes of their own education and use.

2. Water Budgeting.

   Farmers should be instructed in the basic concepts of water budgeting as related to crop need. Simple and clear explanatory material in their own language should be provided to reinforce these ideas as a guide.

3. Irrigation Methods.

   Farmers should be made aware of improved irrigation methods related to soil condition and crop need and how water is applied most efficiently.

4. Farm Lay-Out and Preparation.

   Farmers should be shown model farm layout schemes which demonstrate optimal use and distribution of water on levelled land. Basic reasons for levelling and lay out schemes should be taught using simple diagrams, charts, or printed material.

5. Soil Types and Touch and Feel Method.

   Farmers should be shown various soil types and how these soils absorb water. Simple methods of determining water content of soils through touch and feel methods should be demonstrated and practiced.

6. Water Course Design and Maintenance.

Farmers should understand the value of improved water courses and learn the advantages related to well engineered water delivery structures. They should be shown how to maintain water courses and how to prevent damage to water courses, nukkas, etc.

7. The Value of Keeping Good Records.

Farmers should be given simple record keeping data sheets and be taught how to use them and the advantages of good records.

8. Extension Principles for Improving Crops.

Regular visits should be made to the farmers during the construction of a new course by Agricultural Extention workers to help farmers to learn how to use proper seeds, fertilizer, and pesticides. Extention workers should help farmers to fill farm plans and data sheets regarding crop information and discuss the importance of these with the farmer.

9. Economic Management Principals

The aim of all improved farming practice is the profit motive based on improved production. Farmers should be shown simplified ways to determine costs and profits. They should be shown how to plan ahead and use limited money most effectively for economic gain. This training should be highly practical in nature, devoid of complex technical jargon and in the language of the farmer. Farmers should be assisted to develop their economic management plan.

D. Tips to the Trainers

1. Keep your talk to the bare minimum, show, demonstrate, and explain. Don't lecture farmers.
2. Use prepared materials to help you make your point such as charts, folders, or other visual aids.
3. Listen to farmers' problems. Write them down. Use these to improve your presentations. Diagnose and then try to prescribe ways to help overcome problems.
4. Interdisciplinary teams are more interesting to listen to than just one man. Use your field assistants, the Extension worker, the sub-engineer and progressive farmers to help you make your presentation.
5. Learn from farmers. Use this information.
6. Two visits may be more beneficial than one lengthy visit. Use the time during new water course construction as a time for farmer education. The prolonged contact of the field team to the farmer is an ideal means to establish contact, to bring new ideas and reinforce these over a period of months.
7. Extension education to farmers is critical during the water course construction period.

8. Annual short courses to farmers will help to introduce new ideas, reinforce those already presented, and maintain improved public relations and good will.
9. Use visual aids, particularly slide shows you can develop which will reinforce your verbal presentations and discussions.

III. DEVELOPING A NATIONAL (CG) CURRICULUM GUIDE IN OFWM

A. Introduction

Trainers from all four provinces, the OFWM Institute at Lahore, and faculty from the Agriculture University, Faisalabad, met in committees to develop the material for a national CG. The document, subsequently published by the Government of Pakistan, Ministry of Food and Agriculture, Water Management Training Institute, Lahore, was entitled, National Curriculum Guide in On Farm Water Management (Bergsma, H., & Gill, J., Eds., 1984).

A portion of this document appears below to highlight the CG development process. CG worksheets in Rural Sociology prepared by the author, related to farmer training have been selected as examples of the Curriculum Guide format developed in each discipline area shown on the Table of Contents, page 91.

B. Curriculum Guide (CG)

The function of the CG is to provide a referent for faculty as they develop syllabi and make lesson plans day by day as they teach. The CG becomes (1) a means to check on progress, (2) a means to develop teaching Modules, (3) a reminder about the need for audio visual materials, and (4) an excellent check list for the development of tests and examinations.

The CG is a road map for planning for teaching. It is not intended to be used for teaching per se rather the frame upon which trainers develop their lectures. The CG has the following components.

1. Topics to be Covered

   These topics represent what professionals in Committee considered to be essential areas for instruction in the present state-of-the-art in On Farm Water Management technology. The topics are ordered sequentially.

2. Major Goals

   These represent what the instructor hopes will be accomplished, such as, "The students will become acquainted with the irrigation water potential of Pakistan through reading and lectures."

3. Instruction Time to be Utilized

   a. Time devoted to each segment of the curriculum will indicate how much stress must be placed in training for the given activity. Additionally, a record of estimated time becomes a way to check if actual teaching time was sufficient or too great. Courses vary in length from one month to three months maximum.

b. Faculty in each training center may wish to vary the time devoted to their professional and area needs.

4. Material Needed

Faculty will have to plan ahead in order to have necessary materials on hand. Listing all required materials helps to create a successful teaching experience by use of appropriate materials, audio visuals, films, etc.

Manuals which were produced during the period between 1977 and the present by Colorado State University are excellent references for developing lessons. The Institute has developed a number of documents recently which are valuable supplementary aids for teachers.

A farmer User Association Training Program (slides and written descriptions) is being developed by the Institute. The format for developing such a slide show is found in Annex 1.

Water management training frequently lends itself to demonstrations, to learning to handle and use new equipment, to working with soils and water. Every effort should be made to use materials for teaching, particularly in the practical sessions.

Faculty should begin to collect a file of pictures, charts, slides, materials, etc., to go with each course. A photocopy machine is most valuable tool as it can reproduce pictures, etc., but it can also make overhead transparencies from printed materials. Use this tool. A Tracer or Photographer can make charts and slides to accompany your lectures.

5. Table of Contents (Example of Complete CG)

Title	Page
A. Engineering Curriculum Guide for Water Management Specialists, Assistant Agricultural Engineers, and Agricultural Officers	1 5
B. Engineering Curriculum Guide for Water Management Supervisors (Sub-Engineers)	6 11
C. Engineering Curriculm Guide for Field Assistants	12 23
D. General Agronomy & Irrigation Agronomy Curriculum for Water Management Supervisory/Sub-Engineers	24 37

E. Irrigation Agronomy Curriculum for Field Assistants 38 45
F. Economic/Management Curriculum for Field Assistants 46 47
G. Economic/Management Curriculum for Water Management Supervisors 48 49
H. Workshop for Group Graduates in Rural Sociology* 50 50
I. Workshop for Group Sub-Engineers in Rural Sociology 51 51
J. Workshop for Group Field Assistants in Rural Sociology 52 52
K. Annex 1 (Farmer User Association Training Program) 53 62
L. Annex 2 (OFWM Training Institute Publication) 62 64

*See material which follows for examples of CG's in Rural Sociology. Other CG's can be found in the publication, "Developing a Curriculum Guide," Government of Pakistan, Lahore, 1985.

IV. CURRICULUM GUIDE WORKSHEETS

Instructional Time = 10 hours
Field/Practical Time = 12 hours
Total = 22 hours

H

WORKSHEET FOR GROUP GRADUATES IN RURAL SOCIOLOGY

TOPICS TO BE COVERED	MAJOR GOALS	CLASS TIME	FIELD PRACTICAL TIME	MATERIALS
INTRODUCTION	(Why should trainees learn this material?)			
Rural Sociology				
1. Basic Concepts	To become faciliar with interaction groups, norms, status, roles, powers and influence, social institution, diffusion, and adoption of innovation	1 hour	1/2 hour	C.S.U. Reports + Reference Books, in Library
2. Process of interaction	To understand the features of cooperation, competition, conflict, and collective desicion making	1 hour	1/2 hour	
3. Communication Skills	To become conversant with means to motivate farmers, how adults learn, and communication process	2 hours	1/2 hour	

WORKSHEET FOR GROUP GRADUATES IN RURAL SOCIOLOGY (Continued)

4.	Organizing WUA	To become familiar with formal rules and regulations, framed by laws suited to local conditions	1 hour		W.U.A. Ordinances by Provinces
5.	Factors increasing acceptability of an innovation	To understand relative advantage, compatibility, complexities, liabilities, observability	1 hour		
6.	Village structural atributes	To become acquainted with cast, baradaries, land tenancy, Statuses, groups distribution of power and influence, factionalism	2 hours	8 hours	Handbook
7.	Leadership Skills	To understand basic concept of leadership, style of leadership, and means of direct people affectively	2 hours	1 hour	Improving Managerial and Leadership Skills
			10 hours	12 hours	

IV. CURRICULUM GUIDE WORKSHEETS CONTINUED

Instructional Time = 10 hours
Field/Practical Time = 12 hours
Total = 22 hours

I
WORKSHEET FOR GROUP SUB-ENGINEER IN RURAL SOCIOLOGY

TOPICS TO BE COVERED	MAJOR GOALS	CLASS TIME	FIELD PRACTICAL TIME	MATERIALS
INTRODUCTION	(Why should trainees learn this material?)			
Rural Sociology				
1. Basic Concepts	To become faciliar with interaction groups, norms, status, roles, powers and influence, social institution, diffusion, and adoption of innovation	1 hour	1/2 hour	C.S.U. Reports + Reference Books, in Library
2. Process of interaction	To understand the features of cooperation, competition, conflict, and collective desicion making	1 hour	1/2 hour	
3. Communication Skills	To become conversant with means to motivate farmers, how adults learn, and communication process	2 hours	1/2 hour	

WORKSHEET FOR GROUP SUB-ENGINEER IN RURAL SOCIOLOGY (Continued)

4.	Organizing WUA	To become familiar with formal rules and regulations, framed by laws suited to local conditions	1 hour		W.U.A. Ordinances by Provinces
5.	Factors increasing acceptability of an innovation	To understand relative advantage, compatibility, complexities, liabilities, observability	1 hour		
6.	Village structural atributes	To become acquainted with cast, baradaries, land tenancy, Statuses, groups distribution of power and influence, factionalism	2 hours	8 hours	Handbook
7.	Leadership Skills	To understand basic concept of leadership, style of leadership, and means of direct people affectively	2 hours	1 hour	Improving Managerial and Leadership Skills
			10 hours	12 hours	

INSTRUCTIONAL TIME = 4 1/2 hours
FIELD/PRACTICAL TIME = 6 hours
TOTAL = 10 1/2 hours

J

WORKSHEET FOR FIELD ASSISTANTS IN RURAL SOCIOLOGY

TOPICS TO BE COVERED	MAJOR GOALS	CLASS TIME	FIELD PRACTICAL TIME	MATERIALS
INTRODUCTION				
Rural Sociology				
1. Process of Interaction	To understand the features of cooperation, competition, conflict, and collective decision making	1 hour		Class Notes
2. Communication Skills	To become conversant with means to motivate farmers, how adults learn, and communication process	1 hour		
3. Village Structural Attributes	To become acquainted with cast, biradaries, land tenancy, statuses, group distribution of power and influence, factionalsim	2 hours		
4. Leadership	Basic characteristics of	1/2 hour	6 hours	
		4 1/2 hour	6 hours	

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V. ANNEX 1

ANNEX 1

FARMER USER ASSOCIATION

TRAINING PROGRAM

Curriculum Development and Training Procedures

1. Curriculum development will relate directly to the needs of the provinces, the geopraphic areas and the social realities of districts in which Water User Associations are formed. Trainers should prepare themselves by reading about the people of their areas. (Library reference: Village Organizational Factors Affecting Water Management Decisions Making Among Punjabi Farmers, by A Shfaq H. Mirza, David M. Freeman, and Jerry B. Eckert; C.S.U. Water Management Technical Report No:35.

   Irrigation and Honor: Cultural Impedements to the Improvement of Local Level Water Management in Punjab, Pakistan, by Douglas J. Merrey, C.S.U. Water Management Technical Report No:53.

   The Slide Show is a vehicle for curriculum development. After the trainers have decided what technical information they will present to farmers, they can use a camera and photograph local scenes to depict what they are presenting. Trainers who use the slides for a lecture/show to farmers should take care not to depart from the slide show through rambling monologue, that is, become side tracked.

Pictures are worth a thousand words.

Trainers should preview the slides before the show to ensure that the slides are not up-side-down, backwards or out of order. This also helps them to organize their thoughts prior to the show.

Trainers can improve their slide shows as they desire by inserting new ideas and taking new slide pictures.

VI. WORKSHEET FOR FARMER USER ASSOCIATION TRAINING PROGRAM

It is important that water users become knowledgeable about the technologies of water management in order to maximize the effort made to prevent water losses, to maintain effective improved water courses and to utilize water for crop purposes in more effective ways. Therefore, short training sessions will be established during which farmers are approached by means of slide shows and group discussion sessions. Various faculty will take part in these training sessions to enliven interest.

A. General OFWM Overview

	Time
1. On Farm Water Management, Urdu Documentary 16-mm Film	1 Hour
2. Discussion and recording of farmer reactions	

Objective: To present a wholistic overview of On Farm Water Management activities in the country and to provide an immediate referant for farmers to relate to during the remainder of the training session.

B. Watercourse Improvement

1. Slide and Lecture Show 45 m/1 Hour
2. Discussion

Objective: Water User Associations as social institutions have been found to be effective means to organize cooperative efforts, to provide a structure in which water users can carry out financial and social concerns of operating a water course jointly and finally are effective means for bringing about change. The slide show will highlight these benefits as follows:

Slide 1 Depicts __________ Concept Presented __________

Slide 2 Depicts __________ Concept Presented __________

Slide 3 Depicts __________ Concept Presented __________

C. Post Improvement - Irrigation Water Management

1. Slide Show 45 Minutes
2. Discussion

Objective: Farmers will be shown basic information about the relationship of water/soil and plants and will be introduced to basic irrigation agronomy concepts with a view to sensitize them to improved means of increasing crop yields through precision land levelling, improvement of farm ditches, water budgeting, irrigation scheduling, etc.

Slide 1 Depicts __________ Concept Presented __________

Slide 2 Depicts __________ Concept Presented __________

Slide 3 Depicts __________ Concept Presented __________

D. Irrigation Methods and Practices

1. Transparancies Show 1 Hour
2. Discussion

Objective: Farmers will learn about ways to irrigate their crops. The timing of irrigation (schedule employed), the amount of water used, and the ways water is distributed to the fields, effects the growth of crops. They will also learn about the merits of irrigation methods vis-a-vis Border, Furrow, Syphon, and Basin methods of irrigation.

Slide 1 Depicts __________ Concept Presented __________

Slide 2 Depicts __________ Concept Presented __________

Slide 3 Depicts __________ Concept Presented __________

E. Maintenance and Follow-up Assistance Through Water User Associations

1. Slide Show
2. Brochures
3. Cartoons

Objective: It is important for farmers to understand that continued cooperative efforts will be needed to maintain newly constructed water courses, to administer these fairly, to prevent disputes and to save money. They should also learn the Water User Association's ordinance, rules, and by-laws for their registration.

Slide 1 Depicts ___________ Concept Presented ___________

Slide 2 Depicts ___________ Concept Presented ___________

Slide 3 Depicts ___________ Concept Presented ___________

F. Need Identification Survey

1. Assessment Instrument Administration 10 hours

Objective: A "Needs Assessment Evaluation" will be made to determine farmers' opinions and attitudes in regard to problems and areas which need attention and areas which seem to be highly successful. The results of the assessment will be utilized for future program development and change.

Chapter Five

DEVELOPING TRAINING MODULES

I. INTRODUCTION

The use of training modules in various areas of technical education is widespread. The International Labor Organization has shown leadership in this area through the production of hundreds of modules in various technical disciplines, including Management education.

Mir Mohammad Ali, in his excellent book on Technical Education in Pakistan, (National Book Foundation, 1980), writes:

> The modular concept is one analyzing the elements of training and arranging them on the basis of compatible inter-connecting parts. These can be arranged and re-arranged in different patterns to construct solutions to varying training needs.
>
> It is therefore stipulated that, based on the specific task analysis, suitable grouping of tasks be clustered together to form what are called "modules of Employable Skills."

On Farm Water Management Training is a complex task because so many different technical skills are required in the construction of water courses in irrigation agronomy extension work, precision land levelling, management of construction teams, etc. The Curriculum Guide (CG) outlined the framework for such a curriculum. Those modules are a direct extension of the CG. Each aspect of the curriculum can be broken down into discrete training modules by faculty/trainers.

The modules presented here were developed by the author as examples for faculty to use as they worked on their own curriculum in engineering, agronomy, and economics. A bilingual English/Urdu publication written by the author, Training Modules in On Farm Water Management, published by the Water Management Training Institute, Punjab, 1985, contains eight modules. Of these only four have been selected to exemplify the process of developing these ways of presenting material. The Urdu translations are not printed in this document.

Watercourse construction alone does not ensure increase in crop production or saving of water. Humans need training, construction teams need training in order to bring about necessary changes.

Ishtiaq Hussain Qureshi writes, in Education in Pakistan (Ma'Aref Printers, Pakistan, 1975):

> Indeed investment in physical development has never produced the results expected from it without simultaneous investment in education, whether through schools or through audio-visual aids or demonstrations.

Modular training requires a large investment of time by faculty to develop sequential learning modules. These, however, are valuable and readily usable means to train students.

II. EXAMPLES OF TRAINING MODULES

A. Learning Module 1 - Introduction to Use of Modules

Objectives:

- To help trainers and faculty to develop alternative ways of teaching through the use of learning modules.
- To present an overview of the rationale behind the use of modules.
- To present the reasons for the use of learning modules in technical education.
- To outline ways trainers can use modules in their teaching.

1. Alternative Ways of Teaching

Teachers normally use lectures as a way to present material. Though this system is widely used, it has some drawbacks. These are:

a. Students are passive listeners.

b. Students' attention spans are short and lectures are frequently long. Boredom occurs.

c. Lectures are teacher centered, not student centered to meet their individual needs.

d. What we hear once is easily forgotten unless additional reinforcement is used such as discussion, reviews, quizzes, reports, assigned reading, slides, movies, etc.

Alternative ways to teach are many:

a. Teaching a skill through demonstration and student practice.

b. Teaching through use of visual aids to accompany oral presentations.

c. Teaching by having students look up material, summarize, and report it.

d. Teaching through having problems presented to groups and having the groups come up with solutions.

e. Teaching through simulations such as the use of modules, the use of materials that resemble real life.

f. Teaching through questioning, "the Socratic method."

g. Teaching through use of technical machinery, computers, calculators, scientific devices to perform tasks given by the instructor.

h. Teaching through field demonstrations and actual work in the field such as surveying, talking with WUA farmer groups, etc.

i. Teaching by means printed hand-outs on which lesson points are high-lighted.

j. Teaching through use of library reference books from which students must get material to answer questions set by the teacher.

    k. Teaching through debate, where opposite sides present view point to convince others.

    l. Teaching through field trips to observe specific operations previously discussed or learned.

    m. Teaching through use of printed self instructional modules.

2. Rationale for Use of Learning Modules

    a. The Trainer

        1. Learning modules require that the trainer focus directly on topics to be covered in the Curriculum Guide.

        2. Learning modules require the trainer to set careful objectives and basic concepts related to these in a concise manner.

        3. Learning modules become permanent teaching devices for use later on and help the trainer save time for improving his lectures and visual aids.

        4. Learning modules become excellent ways for checking on students' progress step by step.

    b. The Students

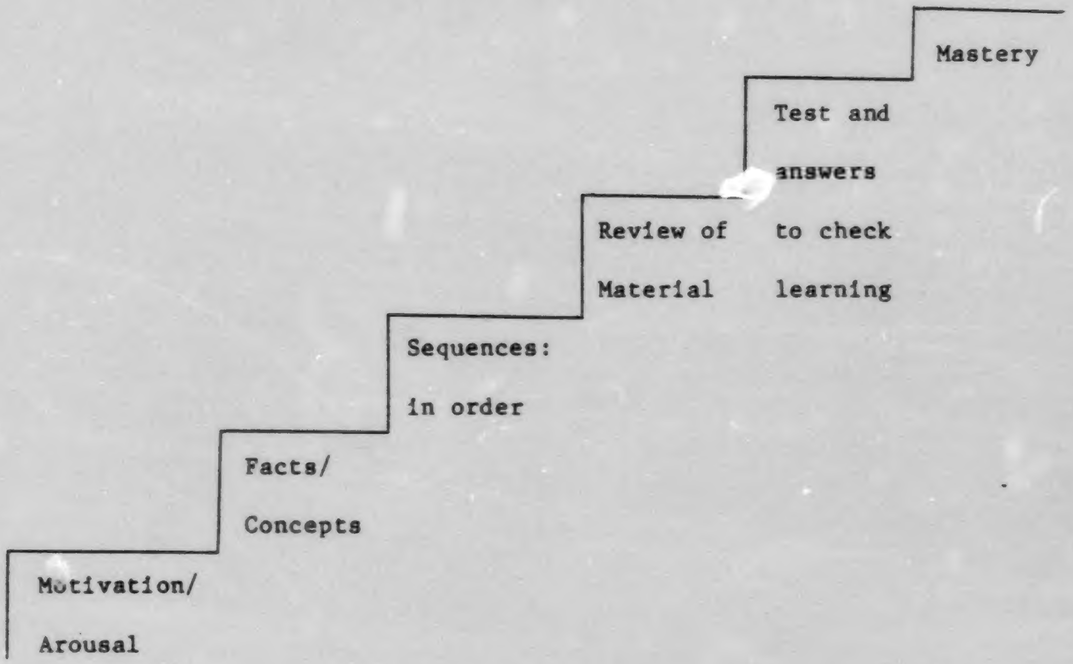
        1. Learning modules allow students to do work personally--at their own pace.

2. Learning modules are a systematic way to present concepts, review these and test students' retention.
3. Learning modules are motivating because they are an excellent alternative to lectures.
4. Learning modules are student centered, rather than teacher centered.

3. Use of Modules in Technical Education

Technical education students such as those in water management have many new concepts to master. Learning Modules focus specifically on individual concepts and make students respond immediately. Learning modules become a way of checking a student's progress by means of the test at the end of each lesson. Lesson answers are provided so students can learn from their mistakes immediately and remediate or correct their responses. Learning modules require mastery of a concept rather than limited recall required on final tests.

Technical education is frequently sequential, that is, one concept should be mastered before going on to the next. Modules are excellent ways of creating learning sequences.


Mastery
Test and answers to check learning
Review of Material
Sequences: in order
Facts/ Concepts
Motivation/ Arousal

4. How Can Trainers Use Modules

   a. After a lecture on a number of concepts, use a module to reinforce the oral presentation.

   b. Each point of the module can become a point for clarification (lecture) to the students, i.e., the module is a printed hand-out which students look at during lecture.

   c. The module can be used as a review of basic material concerned in a unit. The trainer constructs the module primarily to help students review and remember main points.

   d. The module can be used in a teacher's absence by another teacher because it is self-teaching and does not require the substitute teacher to make a new preparation.

e. Modules can be stored and used again. This saves time. Modules can be used repeatedly. They can be revised easily.

f. Modules can be developed by students, with teacher help as an alternative to taking lecture notes.

5. Review Exercise

Four rationale for using modules in the training process are:

a. ____________________

b. ____________________

c. ____________________

d. ____________________

Write a one paragraph essay to support the use of modules as a way of learning, from the student's point of view.

Answers to the questions are in the textual material already presented.

Four drawbacks of the lecture method are:

a. ____________________

b. ____________________

c. ____________________

d. ____________________

Eight alternative ways to teach are:

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________

B. Learning Module 2 - Roles of the Trainer

Objectives:

On successful completion of this module, trainers will be able to:

- Identify major tasks of instructor/trainers.
- Identify requisite professional qualities which an instructor should possess.

1. The major task of the trainer is to help each individual trainee to achieve learning objectives. Some trainers think that if they present material verbally that their responsibility stops there. This is not the case. Trainers should do everything possible to:

    a. Set out objectives clearly so trainees understand where they are going and what they are expected to learn.

b. Present material in a variety of ways to trainees, that is, through lecture, demonstration, laboratory exercises, reviews, discussions, practical work assignments, handling and using equipment, etc.

c. Check on trainees learning to see if they:

- understand and remember
- can apply and use new information
- can demonstrate that they can perform skill related tasks correctly

2. The instructor knows he is successful when students perform successfully, perform efficiently, and know how to do their jobs. Technical training requires "know how" to be the primary goal.

3. The tasks of the trainer vary with the discipline, the system, and his students. In general these are to:

a. Prepare each lesson with care so that the lesson contains immediate learning goals understood by students.

b. Prepare materials related to the lesson to enhance motivation and student interest and to reinforce learning.

c. Demonstrate skills carefully and allow students to practice (see module on skill demonstration).

d. Check and evaluate students' progress individually and as a group. Keep records of student progress accurately to use for evaluation, diagnosis of problems and remediation.

- e. Make available all the equipment, tools, demonstration sites for practical laboratory and field work.
- f. Keep all students on task. Don't allow a number of them to stand around and not participate.
- g. Maintain group order. Don't allow the aggressive students to dominate others; involve all in active goal oriented tasks.
- h. Revise your training procedures based on what works well, or doesn't work.
- i. Guide trainees in their studies.

4. Behind the scene the trainer will be expected to do a number of other tasks:
   - a. Participate in planning and curriculum construction.
   - b. Develop training media, slide shows, posters, etc.
   - c. Advise about purchase of needed equipment.
   - d. Plan and organize field trips, farm demonstrations, farmer field days, etc.
   - e. Keep record of supplies and stores which he uses regularly.
   - f. Carry out administrative duties like compiling reports, making payments, etc.

NOTE: The trainer's job is not done when he leaves the classroom. It is never done, because he must learn new information in his discipline, correct old curriculum, write new manuals, and advise students.

5. In the old training systems, the instructor's role was to distribute information. This is called "teacher centered" instruction and the learners are required to be passive receivers.

6. In new technical training systems, the teacher or trainers is the "Manager of the learning environment." He plans, he prepares materials, he facilitates, he guides, he advises, he instructs, he demonstrates, he checks on students, and he records. Such learning is "Trainee Centered" or active learning by trainees with a trainer who facilitates.

NOTE: The trainer is an expert in a discipline area. This knowledge gives him the ability to decide what is the best way for trainees to share some aspects of this knowledge specificlly related to their jobs. The trainer does not provide general education.

7. Qualifications of a trainer

In order for a trainer to be successful be should be:

a. Well qualified, professionally, in his field.

b. Current in new developments which have occured since he got his degree.

c. Highly interested in developing expertise in the field related to his assignment, i.e., water management technology.

d. Fluent in oral communication, a good writer.

e. Able to motivate people, students, and fellow.

f. Curios about how people learn, how they remember, how they develop skills, and how easily they forget and why.

g. Ability to maintain good human relations.

8. Technical occupational skills of the trainer come from:

a. Lots of experience in applying their discipline in practical situations. (Classroom bound trainers don't understand field, farm problems.)

b. Theoretical training (refresher courses) in up-to-date water management technology discipline areas.

c. Ability to work with students in technical projects and thus develop sensitivity to how skills are attained and what prevents skills from being learned by students. (The greatest tubbla player of the past, who did not touch their drum for years - lost the ability to play well and play with other musicians.)

9. Instructor skills are ensured by:

    a. Instructor or trainer training on a regular basis.

    b. Practice by trainers to use new skill training and checking methods.

    c. Developing and perfecting objectives, lessons, and demonstration materials.

    NOTE: Teaching is an art. But training is a skill which can be improved and developed using new training techniques.

10. Communication, speaking, teaching orally, are skills which can be improved. Use of the langugae of the student, i.e., Urdu, Pushtu, etc., enhances understanding. When a teacher speaks he should look at his students to see if they are attentive, if they give signals of understanding, etc. If there are confused looks, boredom, restlessness, the trainer should change his way of communication, check on students' problems, etc.

11. Communication training requires knowledge about:

    a. The communication process (feedback).

    b. Use of various ways to communicate - verbal, non-verbal, etc.

    c. How to use written symbols effectively.

    d. How to use oral speech effectively.

NOTE: It has been found that students remember very little of a 'lecture' even an hour after it was presented.

12. An effective instructor maintains positive human relations. He does the following:
    - a. Avoids threats and sarcasm.
    - b. Avoids embarrasment.
    - c. Avoids showing favoritism to a few students.
    - d. Avoids punishment as a means to 'motivate.'
    - e. Is able to admit his own mistakes. Can laugh at himself.
    - f. Shows interest in individual student problems.
    - g. Praises students, faculty, and administrators who do good work.
    - h. Keeps his personal private beliefs to himself, sticks to his professional task.
    - i. Shows trust for others until they break the trust.
    - j. Deals with individuals about their problems first, doesn't gossip to others about them.
    - k. Is friendly, consistent, and "practices what he preaches."

C. Learning Module 3 - Helping WUA Farmers to Overcome Resistance to Change

Objectives:

- To help trainees understand that:

-- People resist change because of what they have previously learned

-- People can be taught to overcome resistance to change.

-- Techniques exist to help people learn to deal with change more effectively.

1. Change in the twentieth century is occuring at an ever increasing rate through:
   a. Introduction of new technologies (implements, electricity, pesticides, water management).
   b. Scientific exploration through research.
   c. Growing populations which force people to interact in new ways because of crowding and the need to share scarce items.
   d. Improved communication systems which brings new ideas to isolated people instantly (radio, TV, newspapers).
   e. Literacy which allows people to share in world knowledge.
   f. Conflict in international and national politics creates changes in ideas, in use of territory, in the value of human life.
   g. Educational institution which are created to bring about change formally.

2. Traditional people, however, do not look at new ideas and change as necessarily good. Traditional people are *conservative*, that is, wishing to keep on doing what they are most comfortable doing and what they believe to be true (even if it is wrong).

3. Farmers in WUA's cannot afford risk which some change requires because:

    a. They operate at a *subsistence level* with very *marginal profit*.

    b. The land, in many cases, is not theirs, and as tenents they carry out the landlord's wishes.

    c. They will remain after the new programs leave; so they, as members of a group or society, must be careful to retain social unity.

    d. Cultural and religious beliefs may speak against some changes which are considered to be morally wrong.

    e. They have fear of failure of a new method which is untried.

4. Many employees or trainees in On Farm Water Management are highly resistant to change. They may resist change in many ways:

    a. Flat refusal to cooperate.

    b. Argue about their point of view.

    c. Become defensive and not participate.

   d. Become passive.
   e. Agree with what you say but not do anything.

5. A common error made by supervisors is to assume that farmers will welcome ideas for change.

   Frequently we hear a supervisor of a watercourse construction project say, "But I explained it to you already." Demonstration is a better way to "tell" a farmer.

6. Reasons why people resist change are:
   a. They are naturally conservative.
   b. Experience of the past is valued more than new ideas.
   c. Change involves extra effort.
   d. Change may require more time.
   e. Change may mean that initial performance may not be up to standard and therefore threatening.
   f. It may be easier to do nothing at all than do something one can be criticized for later.
   g. New ideas may require changing old beliefs.
7. Steps to use to get people to change:
   a. Explain the reasons for change carefully.
   b. Explain the problem which change is supposed to resolve.
   c. Discuss the program's objectives, ideas, and possible modifications.

   d. Invite their cooperation (Do not argue, shame others, or use force).

8. Changes are more acceptable if:

   a. A well known or respected person or change agent can be shown as one who made similar changes

   b. Examples can be given of how other people benefited from the change.

   c. Advantages can be listed which will occur because of change.

   d. Demonstrations can be made which will show the results of change.

   e. Profit occurs to the change as a result of change.

9. Progress check:

   a. Write down possible changes you may wish to introduce in your work on a field team.

   ____

   ____

   ____

   b. Write down the steps you intend to take to convince others to change (i.e., see a above).

   ____

   ____

   ____

   ____

   c. Re-read items 1-7.

10. Quiz: Fill in the blanks:

a. Changes occur all over the world rapidly because:

1.

2.

3.

4.

5.

b. People resist change in many ways such as:

1.

2.

3.

4.

5.

c. Reasons why farmers resist change are:

1.

2.

3.

4.

5.

d. Steps to use to get people to change are:

1.

2.

3.

4.

5.

e. Changes are more acceptable if:

1.

2.

3.

4.

5.

D. Learning Module 4 - Apprenticeship Training Supervision

Objectives:

- To acquaint faculty, trainers, and field water management specialists with:
  - -- the basic principles of Apprenticeship Training Supervision
  - -- the method to help apprentices to learn their job better, the method to evaluate the work of the field apprentice

1. Overview of Apprenticeship Training

   a. An apprentice is a fully "trained" person who will practice what he has learned in a real job, under supervision, and for a specified time period.

   b. The apprentice receives a normal salary, however, he successfully completes the on-the-job training and practice under supervision.

   c. The apprentice is never left fully on his own, rather, is under a senior On Farm Water Management staff or field worker who is experienced.

d. The apprentice knows ahead of time what to do, how long he will do it, and how he will be evaluated.

e. Most agencies require that apprentices sign contracts for the apprenticeship such as for three months or six months. Contracts protect the trainee and the directorate staff.

f. Supervisors of apprentices are normally given a short training course before they are assigned an apprentice.

g. Supervisors of apprentices must know precisely what tasks will be assigned to the apprentice, how these will be evaluated, and how long the duration of the training will be.

h. Each apprenticeship will be slightly different because of the character of the supervision, the trainee, the field conditions, and the team composition.

i. Apprenticeships are powerful ways to get a new trainee to perform accurately and well, because his career depends on excellent performance.

2. Methods used by the Supervisor to Help the Apprentice Learn

a. Daily assignments are given and daily check-ups are made and recorded to see if the tasks were performed.

b. Frequently, supervisors will need to show, to tell, and to explain to the trainee. Do not assume the apprentice knows how to do a task simply because he had training at an Institute.

c. Reinforce good work of the apprentice through praise. Use few negative statements. Don't become angry. Don't make the trainee afraid. Don't threaten.

d. Develop a system for having apprentices report on problem areas so that problem solving discussions can occur regularly.

e. Demonstrate how a task is to be done, then let the trainee/apprentice do the task. Check the first try for accuracy. Let the apprentice see you get your hands dirty.

f. Review the trainee/apprentice contract from time to time to help you remember your responsibility.

3. Evaluation Methods

a. Observe tasks being performed daily. Keep a notebook and record observation comments:

"January 4, 1985. The apprentice broke the tripod through carelessness."

"January 15, 1985. The apprentice was able to complete the Farm Plan very well. Pleased."

b. Tell the apprentice, each week, about his progress. If there are trouble areas, deal with them at once. Don't save them up for the last week when it will be too late for the trainee to change. It is hard to change history.

c. Tell the trainee/apprentice what your final evaluation will be. He has a right to know. He may disagree, but at least he is informed.

d. Send evaluations to the Institute which will award the certificate and which will recommend appointment to the directorate.

4. Check List

a. An apprentice is defined as:

b. The appointment of an apprentice is not the same as appointment to a regular job because:

c. The value of an apprentice contract is:

d. Why are supervisors of apprentices given training before they supervise?

____

____

____

e. Briefly list four ways a supervisor can help his trianee/apprentice to do a better job:

____

____

____

f. List three evaluation methods of the supervisor:

____

____

____

Chapter Six

TRAINING OF TRAINERS

I. INTRODUCTION

In situations in which new technologies are introduced in a developing country such as Pakistan, the key agent for introducing the innovation is the trainer. The trainer is the change agent who faces large groups of trainees who will work on field teams. These trainees need to be made more effective workers as rapidly as possible. This places much responsibility on the people who design curriculum and who teach, i.e., the trainers.

Trainers are difficult people to recruit because teaching is not the first choice of an engineer or agronomist in many instances. Appointment to a university would have greater appeal for many professionals, however, appointment to a training institute in which very specific skills are learned is frequently not coveted.

In some instances, internal appointments or shifts are made within the technical organization and professionals are "forced" to teach in the technical training institute. In other cases, after long advertisement for a vacant position, no candidates appear, then internal shifts are made and people find themselves teaching for a year or two. Persons close to retirement are sometimes selected to fill out their last couple of years in a teaching assignment.

Add to this, the problem of transfers to other departments by means of trainer's applying for other positions. Faculty who have talent and skills frequently leave because of greener pastures, particularly in private industry.

There is a critical need to develop a group of trainers who are motivated and dedicated to training. Incentive systems must be considered and developed to help administrators recruit good teachers. In-country training and overseas training for such people must be systematized so that all who teach are well prepared and motivated.

As new training institutes develop in Pakistan in irrigation management, generally, the first order of business must be the recruitment, training, and retention of a group of talented trainers. A nucleus group, once appointed, become trainers of others who in turn train farmers. The use of directorate staff for training poses many problems. First, these poeple are preoccupied with matters of administration and having to take time out for training is a burden.

The training portion of various development projects is similarly an add-on after funds have been allocated for physical construction projects. The designs of proposals for new development projects dismiss the training functions in a sentence or two. It is, therefore, quite understandable that training _per se_ has taken on low priority by most.

Training of trainers is a critical factor to the eventual success of technical assistance projects.

It has been mentioned before that foreign consultants who reside in developing countries such as Pakistan for prolonged periods, could well serve as technical resource poeple for training purposes on a regular basis, especially if their own recruitment included training as one of their "terms of reference." Nationals within various ministries and technical projects also have broad areas of expertise which could readily be tapped if incentives could be provided for becomeing involved in such training of trainers.

Trainers should receive regular training themselves, both in country and abroad to keep them current and motivated. An analysis of those sent overseas for training would show that a small minority of those send abroad are in fact trainers. Additionally, those returning from training abroad, in many instances, use the foreign training as a means to move up their career ladder.

There is the need to develop a system which recruits good people for trianing, provides incentives for them to stay, and regulations which ensure that equal service in training will be given to time spent in training overseas.

During 1984-1985, a group of Pakistan professionals, who had received overseas training related to water management, met and discussed the problem of training of trainers. Their ideas are presented below:

Training Concerns of Those Returned from Overseas

Discussions were held which were focused on ideas related to training. A few ideas emerged, namely:

The need to bridge the gaps between Agriculturalists, Engineers, and Irrigation Agronomists in the training process.

The need to carefully re-think how best to present new ideas to lower level trainees in Pakistan such as Field Assistants.

The need to consider the development of discrete printed modules to accompany lectures.

The need to encourage trainees abroad to assist in the training function by collecting published materials, taking slides, and making technical reports on their return.

The need to better match trainees sent overseas to their study programs.

The need to standardize trainees' evaluations of their overseas experiences.

II. TRAINING ABROAD FOR OFWM PROFESSIONALS (DEVELOPING A SYSTEMATIC SELECTION APPROACH)

A. Introduction

During recent years, more and more opportunities havee been made available for Pakistani nationals to go abroad for training. These opportunities have been funded by foreign agencies, however, the majority, in the case of On Farm Water Management were under U.S.A.I.D. funding schemes.

Opportunities for training abroad for professionals are excellent means to up-grade the skills of persons in On Farm Water Management, to up-grade knowledge about development in the state-of-the-art in their respective disciplines and general knowledge about development in water management technology in other countries. Trainees abroad have opportunities to see other countries and learn about other cultures as well. All of these are important aspects of training.

Some of the hidden benefits which occur take the form of changed professional attitudes of participants, greater professional maturity, a heightened degree of personal motivation for their jobs, friendly and professional contacts developed abroad and willingness to try new ideas and become involved in change oriented programs which require a degree of risk. Persons who have seen what is possible through hard work and application of skill in other countries, frequently are willing to try innovative approaches themselves. Trainees abroad pick up printed material prepared by professionals who set up these courses. They pick up books and literature and take photographs. A few return and write about their experiences.

All of this sounds positive. However, a number of questions need to be asked about overseas training. For instance, is the course abroad suited for the trainee who will participate, in terms of his discipline, his work assignment, and his scholarship? Additionally, is the trainee who goes abroad the correct person for the organization's needs. By correct, one means will the person's additional training directly benefit the sponsoring organization, that is, On Farm Water Management? Is the English language level of the trainee high enough for him to benefit optimally?

How was the trainee selected? What criteria for selection was applied which ended in the choice of a particular individual?

What mechanisms exist in On Farm Water Management to specify need related to the system's operation in the field construction teams, in the directorates, and in training centers.

B. Selection Methods

A variety of methods could be employed in the selection and recommendation process for overseas training. A few are discussed below.

1. "Good Old Boy" Approach

In a number of countries, an approach which has been used, is that opportunities for training abroad are announced by a funding agency such as U.S.A.I.D. to Ministries, Secretariates or Directorates of organization. Informal discussions are then held within these administrations about who should go on these training tours.

In such informal systems, training abroad nominations can easily be used as awards to achievers or "good old boys" or used as incentive awards to those who have done good or long service for an organization. Nominations from parts of the organization frequently are made for internal promotional reasons. In developing countries, the use of the "good old boy" system in nominating for overseas training has a number of problems. Appointments are sometimes made to people who, upon their return, will give minimal service in the area of training because selection for training was not based specifically on organizational need, tasks to be performed and objectives set for the training. In this system, the focus is on those who recommend as opposed to those who will perform a valued technical service upon return. Departments may have specific needs for up-grading their professional staffs, however, view the overseas training system cautiously because nominations from the department based on program need *per se*, may end in disfavor by those who are making selections, using other criteria. Additionally, nominations by name may be viewed negatively by the higher administration as it puts pressure on them to reject these named individuals if they favor a "good old boy."

a. Discussion

When trainees, who return from abroad, report that the courses in which they took part were unsuited for them professionally in their respective discipline, such as an agronomist taking part in a training course which was basically designed for civil engineers, then hard questions arise about the selection process itself.

In most developing countries, manpower development is a critical need. Development of manpower for specific organizational needs is both rational and positive. Some overseas training programs are designed to meet these needs. There must, however, be a careful match between trainee and overseas program if this manpower development scheme is to be highly effective. People who are sent abroad at great expense, should be selected carefully for specific organizational benefits. Their level of training, their assignment, and their discipline all should be considered carefully before being sent abroad.

It is recognized that in many instances, organizational and administrative red-tape gets in the way of nominating candidates in a systematic way. Frequently, funding projects announce a deadline which must be met by the host country. If the time is limited then it is difficult to institute a systematic process to meet the "crash need." Consequently, informal means are used to nominate persons to go abroad without careful screening and thorough knowledge of the type of program which the trainee will receive. Frequently, deadlines pass and available funds for training abroad are not utilized simply because the mechanism used by the host country requires much informal discussions and clearance by agencies and ministries other than the one making recommendations. There is obviously much value in the role of national screening boards for reasons of objectivity and maintaining country manpower training needs. However, if in-country mechanisms for overseas training frequently end up in non-utilization of the training opportunities, then questions need to be asked about the system itself. The "old boy" system, or some varieties of it, obviously operate everywhere. In countries where there is critical need for large numbers of persons to receive training, if the system prevents the right people and the right number of people from receiving foreign training then the system should be changed.

2. Systems Approach in Nominating For Overseas Training

One could define the Systems Nominating Method as one in which all the component parts of the nominating process are related effectively so that in-country program needs, candidates' needs and overseas program offerings all tie together systematically and effectively. This method is not complex, however, it requires that all parts of the organization cooperate, that all in the system participate.

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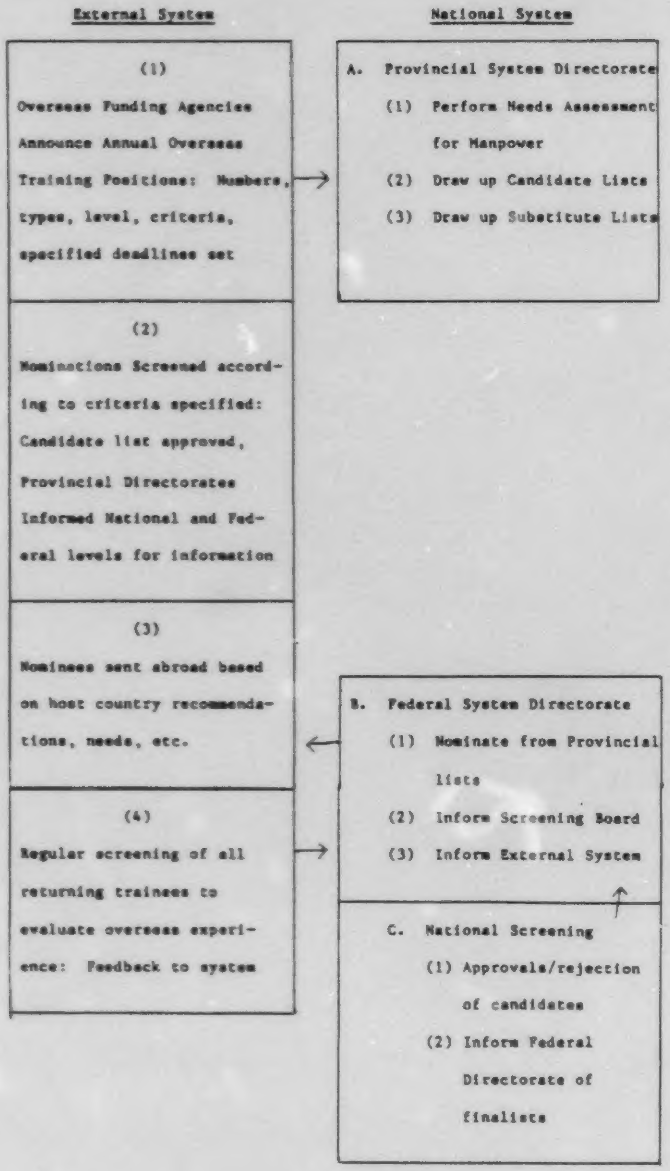
The basic features of this systematic approach to nomination is that while external funding agencies are going about their business of selecting training projects and funding these, the host country is engaged in an independent system of deciding about the type, level, and number of trainees it needs based on actual program operation and growth. This means that the candidate selection process is regular, rationally derived, and tied together in a structure. Crash

Figure 9

SYSTEMATIC OVERSEAS TRAINING MODEL



External System

(1)
Overseas Funding Agencies Announce Annual Overseas Training Positions: Numbers, types, level, criteria, specified deadlines set

(2)
Nominations Screened according to criteria specified: Candidate list approved, Provincial Directorates Informed National and Federal levels for information

(3)
Nominees sent abroad based on host country recommendations, needs, etc.

(4)
Regular screening of all returning trainees to evaluate overseas experience: Feedback to system

National System

A. Provincial System Directorate
  (1) Perform Needs Assessment for Manpower
  (2) Draw up Candidate Lists
  (3) Draw up Substitute Lists

B. Federal System Directorate
  (1) Nominate from Provincial lists
  (2) Inform Screening Board
  (3) Inform External System

C. National Screening
  (1) Approvals/rejection of candidates
  (2) Inform Federal Directorate of finalists

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program operation, in which the host country responds urgently to set deadlines, etc., are minimized by use of the systems appraoch. A regular pipe-line of candidates is provided at all times in such a system. But even this system cannot avoid some aspects of the "old boy" selection process. However, this would also be minimized because selection would be based on known program needs.

The prerogatives of the host country and those of the external funding agency are maintained in such a system. One criterion of a system's usefulness is the way it facilitates the reasons for which it was established. Frequently, speed is an important consideration in foreign funding concerns. If the system supports simultaneous efforts of all its parts, feedback of information will be more rapid than in an ad hoc process. For instance, the funding agency reports directly back to the Provincial Directorates, however, informs the National and Federal Directorates as well in the process, since they already approved of the candidate lists. The idea of the system is to cut out unnecessary blocks for transferring information, yet support decisions made.

3. *De Jure* Informal: Candidate Appointment System

In this system the Provincial Directorates collect the names of possible worthy candidates from all regional directors. When the number of places for training are known, assistant directors, directors, and director generals have antonomy to make their nominations. The highest person at each level screens out candidates he feels to be unsuited using his own judgment. This system is based on the *de jure authority of administrators*. It frequently works quickly and is able to respond to urgent external requests. There are, however, obvious problems related to the "old boy" system. Favorites among candidates rise like cream. No rationale for selection need be provided to any but the one at a higher level. There is power inherent in being able to award a highly desired professional benefit which is obviously held by the directorate administrators. Trainees who return are usually requested to write up a "de briefing" report. Unless specific guidelines are provided for such a report, and if a due-in date are not specified, the trainees can return and easily forget to write their report. Alternatively, they may be asked to appear for a short oral de-briefing with a superior, "over lunch." The basic concern with such a system is that it fosters dependency on administrators, it fosters an atmosphere for favoritism, it is not based on objective needs of program growth and it is not regular or systematic.

C. Other Systems or Non-Systems

A variety of other approaches could be used which incorporate some or all of the systems discussed, or none of these, for example, when all appointments are made by the highest administrator in the system utilizing his own informal feedback system, or, a general posting of the possible overseas positions to be made available and application solicited from interested candidates. These are sent to an administrator in the system who forwards all the names to the selection board and lets them struggle with decisions regarding nominations to the funding agency.

D. Summary

There is a great need in On Farm Water Management to attract well qualified people and retain them as professionals in this vital aspect of government service. Overseas training is an incentive for recruitment and retention of good people. If positions offered by funding agencies "go to waste" because of the inefficiency of national recommendation systems, than a vital manpower training resource is being wasted. On Farm Water Management was established as an agency to help conserve a precious national resource, water, which according to many specialists was being lost at a rate exceeding 50% of total water available for farming. Likewise, a strong argument can surely be made that if the inefficiency of the recommendation system end in loss of a significant percentage of overseas training positions, a vital resource is being wasted. Highly trained manpower to maintain and improve agricultural systems in Pakistan are greatly needed. Overseas programs, if efficiently used, can help satisfy some of this need.

Chapter Seven

DEVELOPING TRAINING PROGRAMS FOR ADULT FARMERS AND WATER USERS

I. INTRODUCTION

A continuing concern among those involved with irrigation and On Farm Water Management is the problem that farmers or water users receive little systematic training in such areas as watercourse improvement and maintenance, irrigation agronomy, and farm management procedures. "Without the active participation and cooperation of water users, the government's ambitious program for improving the nation's watercourses and better managing its limited water resources may be in jeopardy. There are on-going attempts to determine a satisfactory set of incentives to encourage water users to form functioning associations. However, better water management may be achieved more readily by working directly with the individual water users through a well-designed extension program based on practical applications of research results" (Reiss, 1984).

The key words above are "working directly with individual water users" and "a well designed extension program." The implication of the above has been stated, that is, little systematic training has gone on in all the provinces among farmer water users. As far back as in 1977 materials were produced under the Colorado State University U.S.A.I.D. project in a training manual under subject titles of "Extension Programs - Methods," "Planning and Organizing a Watercourse Committee to Accomplish a Watercourse Improvement or Cleaning and Maintenance Program," and finally, "Implementation of a Cleaning Maintenance on an Improved Watercourse." (See Appendices A-C for examples of these lessons.)

Additional lessons in demonstration methods were developed to assist trainers to work with farmers.

During 1984, an informal survey made by the author of what was being taught to farmer water users revealed that in the Sind, Baluchistan, and the Northwest Frontier Provinces, little or no farmer training was accuring in any form, except the meeting with farmers to establish WUA's. In the Punjab, on the other hand, various types of training were being attempted, the majority of which consisted of one or two day sessions to brief farmers about the WUA regulations and bring them up to date on the On Farm Water Management Program's services. In mid 1984, more formalized short one-day training sessions were held in the Punjab using slide shows. The subject matter content of these presentations were irrigation agronomy and watercourse maintenance. A beginning had been made.

There remained the problem, however, that WUA's, once established, did not persist well as institutions for change, for group unity, for long term effect on the farms and watercourses which were constructed. Also, training to farmers had been a once a year, between semesters, or crops, short training which had not been systematically organized to reach the majority of water users. Additionally, the curriculum had not been systematically coordinated provincially and nationally.

Some attempts had been made to deal with this problem at the University of Agriculture, Faisalabad, Water Management Research and Training Program in their limited project area. C. Ghulam Hussain (1983) wrote about the problem this way:

> The experience has amply demonstrated that the success of watercourse rennovation and maintenance programs is dependent, to a large measure, on the whole-hearted cooperation to be extended by the water users. Hence, the motivation of the farmer is a key factor in the successful completion of water management projects, particularly watercourse construction and maintenance.

Hussain pointed out that the vehicle for bringing this all about should be extension programs which were farm-centered. But farmers have been found to be hard to work with in the area of establishing effective and long term organizations (Malik, 1977).

Organizational problems have been the key barrier to establishing effective WUA's up to the present (Mirza & Merrey, 1979). Farmers' indifference to OFWM attempts to bring changes in improved farming techniques related to water management and watercourse improvement remain as the present major barrier to success of this aspect of the On Farm Water Management Project. Hussain, previously mentioned, suggested that farmers were changing, particularly if they were able to see that they would derive direct economic and social benefits from participation in maintenance of their watercourses (Khan & Sadiq, 1981).

Hussain listed eight areas for motivating farmers:

— Motivational methods and media

— Lectures

— Films

— Group discussions

— Panel discussions

— Symposiums

— Radio

— Improved audio-visual aids

All of these relate to training procedures and methodology. There is no doubt that if trainers improve their presentational effectiveness, that their impact may result in higher motivation of farmers to listen and recall information presented.

A problem remains, however, that no systematic curriculum has been agreed upon for farmer training in the Punjab and in the other three provinces. Additionally, research needs to be done to show why there is a tremendous problem of creating unified programs for farmers' training between various programs and governmental units. "Little attention has been given to the institutional constraints at higher levels: the climate created by government agencies, such as the Provincial Irrigation and Agricultural Departments and WAPDA, and then interactions with each other and with the water users. Until we understand the workings of relevant government agencies, how they interact in practice with each other and with water users, and how to strengthen their operations, the likelihood of motivating water users to become involved in water management strategies will remain remote" (Reiss, 1984).

II. RECOMMENDATION FOR CHANGE IN MOTIVATING AND TRAINING WUA'S

A. Establish research efforts to determine social, psychological, and cultural constraints to establishment of effective WUA water channel maintenance programs. Additionally, establish research to show how best to coordinate efforts of the various governmental agencies working with water management including departments of agriculture, education, and irrigation.

B. Develop more effective linkage and cooperation between existing agencies working with water management by holding bi-annual meetings to develop a unified approach and curriculum to deal with the WUA adult education problem.

C. Improve on overall communication to farmers through a variety of means including slide-sound shows, video cassette program development, spot information times on national TV, radio shows to farmers, and publication of materials in Urdu or other local languages related to watercourse maintenance and improving farming techniques.

D. Developing regular training extension programs to accompany the watercourse construction teams to work with farmer groups for one to three months. Develop follow-up methods to encourage watercourse maintenance programs.

E. Hold annual field days to present awards to most successful farmers, exemplary programs, etc.

F. Develop a systematic national training curriculum guide for farmers' educations to be used by all provinces.

G. Develop demonstration plots and farms which show the economic and social advantage of improving farming techniques related to water management.

H. Establish systematic ways to train trainers in all provincial institutes to develop their curriculum and materials to deal with farmer education and by training field extension workers who will be assigned to work with field teams.

I. Seek assistance from abroad to develop highly motivational training manuals in local languages in water management. An excellent example in the English language of such a manual is Water Management on Small Farms: A Training Manual for Farmers in Hill Areas, published under the Water Management Synthesis Project of Colorado State University (Water

Management Synthesis Project, 1983). This book has an easy to read text, clear pictures to illustrate what concepts are being presented and logical steps to take to create improvement. Local language development in Urdu, Punjab, Pushtu, etc., of simular material would enhance training performance by the extension staff assigned to field teams.

III. CONCLUSION

There is no short and easy way to deal with farmer WUA training. A broad unified front is needed at this time which uses information from research, which harnesses many agencies together to work at the problem, which works to develop more standardized curriculum and training materials to be used by trainers, field staff, and farmers. Certainly, training will continue to be the central means of bringing about necessary changes to enhance Pakistan's efforts to conserve precious water and to improve on crop production. Future training will need to be well designed and systematic in nature.

Appendix A

EXTENSION PROGRAMS--METHODS

Trainer	Agricultural Extension
Class Room	Three hours
Field	0 Days

OBJECTIVES

To develop within the trainees:

1. The ability and the desire to be of assistance in improving the lot of the small farmer
2. The capability to apply research information in a manner which results in improved practices becoming a part of the "traditional" management of the small farm
3. The ability to use his training in a manner understood and accepted by his clientele in the development of the single family commercial farm, that is, one which produces more than it uses and which contributes to the welfare of both the farm family and the community

MATERIALS NEEDED

1. Flip chart
2. Slides showing extension activities in the field

TRAINING AIDS

1. Examples of successful extension experiences

2. Research data to be discussed, interpreted, reorganized, for farmer use
3. Simplified demonstration plans for use in setting up a field demonstration of various kinds
4. Farmer publications

INTRODUCTION

Extension is the connecting link which ties research to the farm, presents it to the farmer on his own ground and in terms he understands, and seeks to collect, evaluate, and interpret new information for the farmer as it becomes available. Extension personnel in many countries represent departments (ministries) of agriculture and the universities as well as the farmers themselves. In addition to transmitting information to the farm, they have the responsibility for gathering facts from the country and transmitting them to research agencies so that the research effort can be directed toward solving the primary problems of the people.

The extension worker must be aware of and in a position to assist farm people in locating the necessary inputs required by developing farms, and in using them in a manner which is profitable for the farmer. He may be required to assist in the development of the necessary agribusiness enterprises and markets as developmental activities progress. Most certainly, he will be called upon to help the small farmer recognize and utilize his resources.

In order to accomplish this multiple responsibility, extension must use every tool at its disposal. Every educational method at his disposal is utilized. The "life blood" of extension, however is people. Extension workers must be people-oriented.

The most effective tool which extension has, in the developing country, is "people to people communication." There is no substitute for the satisfied client. Rapid development programs in many countries have proved this to be true... and particularly so where high percentages of the small farmer population are not able to take advantage of the printed word, mass media, and not even personal letters or the telephone.

It is for this reason that, in order to accomplish the goals of a rapid development program in a developing country, many personable, energetic, interested young people must be selected and trained to do extension work. They must want to help the people help themselves. They, in turn, must carry the program to the people. They should be familiar with the people and with their customs and they must certainly be familiar with the kinds and types of agriculture with which they will be working and with the general conditions respresented within the area.

As the extension worker makes his contacts and meets the people, he will be selecting his cooperators and the sites for his demonstrations. From his cooperators, leaders will emerge who are both representative of the people and able to influence others. The time is well-spent by the extension worker as he trains these people to spread beneficial information to their friends and neighbors... and to others in the community who might be of help. No other extension method* is as effective, in the beginning, in the dissemination of information among farm people.

PRESENTATION

Program Development

In terms of program development, the situation in which the extension service in the developing countries finds itself is very similar in some ways to the situation which existed in the United States when the Federal Extension Services was first created. Since there is no (or very little) direct knowledge of what extension work is or what it does, most contacts must be on a person-to-person basis. New methods must be proven to be sound under the conditions which the farmer uses them and they must be profitable on the average farm. "The Demonstration Way" proved to be the most effective teaching device at that time. Combined with other direct educational tools, it still provides greater impact than do other less direct methods. "The Demonstration Way" became the slogan of the Federal Extension Service in America at that time. Program developers in the undeveloped nations might do well to emulate that philosophy.

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*Author's Comment: More recently, it has been recognized that extension work, as described above, is a rather unique American phenomenon and may not work as well in developing countries because of cultural-social factors, farm size, and ownership patterns. H.M.B.

More recent worldwide programs which have been successful have shown that farmer acceptance of new technology requires four basic prerequisites... all of which must be fulfilled if any program is to succeed.

1. Productive and profitable technology must be available
2. The farmer must be instructed in its use
3. Necessary inputs (seed, fertilizer, feed, equipment) and credit must be available to him, and he must be able to use them at a profit
4. Markets must be available for the products he produces. If any one of these is lacking or ignored, the small farmer cannot utilize recommended improvement

Another very important contributor to a successful program is that it be designed to fit the needs of the small, often poverty striken farmer. Improvements which these poeple can use will also aid the larger, more affluent, farmer. They usually adopt new practices first because they can more easily afford them. Many generations of inheritance and land division have resulted in the formation of many small farms and traditional subsistance farming. It is toward this problem that the extension-research team must direct its major thrust, if major improvements are to result.

Trainees who have been selected to accept the extension responsibility should receive instruction in:

1. Approaching the people — gaining acceptance and cooperation
2. Problem identification — what are the greatest needs
3. Result demonstration -- simplified plans that can be explained to small farmers and which can provide needed necessary information
4. Training methods for farmer leaders
5. Methods demonstrations — show and tell (how to do it)
6. Evaluation — for clients

   — for agencies, universities, sponsors
7. Use of teaching aids
   - — New media (if available and usable)
   - — Radio (if available and usable)
   - -- TV (if available to people who need to be contacted
   - — Making and using charts, posters, slides, etc.
   - — Preparing and using leaflets, handouts, etc.
   - — Organizing and conducting field days, tours, institutes, etc.
   - -- Conducting farmer-meetings
   - -- Organizational methodology

Leadership Training

It has been said that good extension workers are expected by their clientele to do ten men's work... and by themselves to do even more than that. Thus, the continuous training of farmer-leaders is not just a satisfying experience for the agent and for his farmers. It provides interested, experienced leadership which can be utilized for program expansion.

Extension experience shows that the rate of early adoption of new ideas is directly proportional to the number of personal contacts between the agent and his cooperating farmers. Likewise, it has been proven that farmer-to-farmer discussion is the most effective tool for dissemination of information. Many agents (in America) have found that informed farmers can reach other farmers more effectively than can the agents themselves. Thus, the agent must continually engage in leadership development if his program is to progress beyond the one-on-one stage of development. His work as a teacher is continuous. Every cooperator and every demonstrator is a potential leader. It is extension's job to see to it that this resource is not underdeveloped, and that the experiences of these people are constructive and enlightening.

Once the farmer-leadership becomes active, cooperators are extremely effective proponents of the program. They can be by far the most respected contributors to farmer meetings, tours, field days, and other extension activities.

Extension influence has been classified as direct and indirect. Direct — that which results from direct contact between extension agents and their clients, and indirect — that which results from contacts between informed farmers and their friends and neighbors. Time and energy limited direct influence. Like the ripple on the pond, however, indirect influence, stimulated by informed constituents can reach far beyond the bounds of individual effor

Evaluation and Reorientation

The evaluation of extension activities and results are continuous. Every day's experiences are reviewed with the idea in mind being improvement. There should be no such thing as "stereotyped" extension programs. Each activitity must be geared to the particular need, the location, and the people or individuals involved.

Longer term evaluations of projects and activities must, by necessity, involve the people for whom those projects were initiated. Questions must be answered, such as:

What was done... what wasn't... why?

Who was benefited... how... who was missed... why?

How can the project be improved... or where do we go from here?

Were the right people involved?

What changes should be made... how should they be initiated?

Extension people and their leadership should be prepared, if necessary, to extend their activities beyond their own conceptions of the normal confines of their responsibilities. For instance, a land levelling project may require custom or cooperative ownership of equipment; a grain improvement program may increase production to a degree which requires market-agribusiness development; production intensification may require greater inputs into fertilizer-chemical and water control devices, which in turn will require credit for operational budgets. The establishment of contacts with people who can provide these inputs and services becomes a highly necessary activity. Farmers may be required to organize in order to be eligible collectively for goods and services not available for the individual and to form water user associations. Again, extensions' responsibilities are to get people together and to help them to accomplish things collectively which they could not have done individually.

As various programs become part of the ordinary farming system, some problems will, no doubt, be solved. As this happens, new needs and new concerns will surface. Program planning, therefore, is a continuous part of the every day activity of every extension worker. The initiation of new, expanded programs will involve more people and provide greater leadership potential. The ongoing extension program for any given area may include projects in all stages of the developmental cycle.

Training Needs

Assuming that potential extension agents have the basic training in the agricultural and engineering sciences, they should understand the basic skills for which they will be held accountable. Perhaps some exposure to the social sciences might also be in their backgrounds. Very few curricula, however, as generally developed within the scientific universities will have included training which provides an understanding of the extension type activities. They should be provided with some supervised indoctrination before they are sent to the field.

To begin with, they will need some help in:

1. General characteristics of small farmers and of the areas where they will be working
2. Refresher... interpretation of research results
3. Preparation of demonstration plans
4. Compiling demonstration results
5. Explaining demonstrations to farmers
6. Organizing and conducting field days, tours, farmer meetings
7. Program planning and execution
8. Understanding contact classifications

Supervised field trips, farm visits, and orientation tours as part of a training program can provide invaluable experience. "Feel" for the job to be done is a training aid that cannot be overemphasized.

Training of this kind will help build confidence in the extension staff. It will instill in them the idea that they are not alone when they go to the field.

Later on, as programs reach the stage where organizational training is needed, it should be provided. Regularly scheduled short-course and conference type sessions, which expose the agents to training improvements, geared to solving current problems, and provide the opportunity for them to learn of the successful work of others are also helpful training media for extension people.

GENERAL CLASSIFICATION OF TYPES OF CONTACTS

1. Classification according to use:

Individual Contacts

- Farm visits
- Work with individuals
- Establishing demonstrations
- Other individual contacts

Group Contacts

- Meeting
  - Demonstrations
  - Training
  - Discussion
  - Planning
- Tours
- Field days
- Conferences

Mass Contacts

- Radio
- TV
- Newspapers
- Magazines
- Exhibits
- Posters
- Leaflets
- Circular letters

2. Classification according to form:

Written

- Bulletins
- Leaflets
- News articles
- Letters
- Reports

Spoken

- Meetings
- Farm visits
- Calls
- Radio
- TV
- Tours
- Field days

Visual

- Demonstrations
- Exhibits
- Posters
- Charts
- Picture-Slides
- Tours
- Field days

CONCLUSION

Properly oriented extension programs, carried to the people by capable, young extension agents can contribute a great deal of favorable impact to rapid development programs in the developing nations.

Extension is a govenmental function--only favorable government commitment and support can provide the necessary inputs required for the creation of the program. Since extension's delegated responsibility is to carry research to the farm and to assist in its adoption, it is imperative that extension and research agencies work very closely together. When this condition exists, and when extension agents receive the necessary cooperation from the farm people, research is transferred to the man on the land in the shortest possible length of time. Likewise, farm problems are brought to the research agencies for consideration and disposal... the program becomes "that of the people."

In final conclusion, it should be remembered that the extension agent is often the final link between the project, his organization, or his sponsor, and the man on the land. It is of utmost importance that he be instilled with confidence and with full knowledge that capable people are behind him when needed. The confident, enthusiastic agent can transmit that same spirit to his farmers. When he knows that his organization selected him especially because of his ability to do his job well, he will work hard to succeed. If, however, he is sent to the field without the proper training and orientation, and if the people with whom he works reflect a negative connotation to his work he definitely won't succeed.

Appendix B

PLANNING AND ORGANIZING A WATERCOURSE COMMITTEE TO ACCOMPLISH A WATERCOURSE IMPROVEMENT OR CLEANING AND MAINTENANCE PROGRAM

Trainer	Agricultural Extension
Class Room	0 Hours
Field	1 Day

OBJECTIVES

1. Introduce trainees to a village situation so they will become more confident in their ability to convince farmers of benefits of On Farm Water Management Project.
2. Organize a watercourse committee in a village.

MATERIALS NEEDED

Transportation to field. Village should be chosen before date of field trip and initial visit made by trainer to determine if farmers have need or are interested in water coursecleaning and maintenance.

TRAINING AIDS

Charts and handouts showing benefits of cleaning and maintenance of watercourse.

INTRODUCTION

As soon as the benefits of the watercourse management program are disseminated to the farmers and the consensus is obtained that the farmers are interested in the watercourse program, a committee is proposed to be organized which shall allow the members of the community to plan and execute programs for watercourse management and improvement.

Heavy emphasis has been placed on the proper approach to farmers, potential problems encountered and the sociological implications in contacting farmers during the Rural Sociology Training. This field exercise is conducted in cooperation with the Rural Sociology Department.* This will give the trainees the opportunity to put into practical use the training they have received. Each trainer should always be present to assess the results of the farmer contacts.

PRESENTATION

The following steps should be followed:

1. Explain the program to farmers
2. Satisfy the needs of the farmers as much as possible
3. Choosing leaders and other members of the committee
4. Induce the farmers in the decision of the basic design of watercourse
5. Impress on the farmer their roles and the government responsibility towards the development, improvement, and management of watercourse

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*Author's Note: To date, no such department has been established in On Farm Water Management Training. H.M.B.

6. Deal with opposition and obstructionists as they arise
7. Impress on farmers need for continued work of committee in the field

APPLICATION

This watercourse should be selected for improvement and the work should start immediately. If the watercourse has been improved previously, a cleaning and maintenance program should be undertaken by the trainees. This should take about five days in the field.

Appendix C

CLEANING AND MAINTAINING AN IMPROVED WATERCOURSE

Trainer	Agricultural Engineer
	Agricultural Extension
Class Room	Three Hours
Field	6 days

OBJECTIVES

To provide trainees with practical experience in organizing farmers for cleaning and maintenance of watercourses.

MATERIALS NEEDED

Surveying instruments, tapes, field notebooks, plans of improved watercourses that are to be cleaned and maintained.

TRAINING AIDS

Charts, graphs, and slide shows showing effects of cleaning and maintenance of watercourse for use in farmers' meetings, charts, outlining procedures and work hours required in cleaning and maintenance of a watercourse.

INTRODUCTION

Since one of your major duties in the On Farm Water Project will be encouraging farmers to maintain their watercourses, it is appropriate to spend a week accomplishing a cleaning and maintenance project. This facet of the On Farm Water Management Project has not been given sufficient emphasis in the past but ensuring that farmers regularly clean and maintain their watercourse is essential to the success of the OFWM Project. It is in the farmers' interests to maintain their watercourses because only then will they obtain the benefits of more irrigation water over the long run. Under existing social conditions, farmers are often unable to organize themselves adequately to maintain their watercourse. They need your help.

PRESENTATION

This lecture period will be devoted to trainees discussing their experiences and problems faced in organizing watercourse committees. They will exchange suggestions, identify problems and explain their proposed strategies for dealing with the problems and seeing that a cleaning program is carried out. The trainers from Rural Sociology, Irrigation and Drainage, and Extension departments should be present at this class.

APPLICATION

The trainers from the three departments of Irrigation and Drainage, Extension, and Sociology together will coordinate and supervise the cleaning and maintenance of the watercourses. The Irrigation and Drainage Department will have major responsibility in conducting the actual field work of cleaning and maintenance. All trainers should be present during all the field days to five on-the-spot guidance and suggestions to the trainees.

The trainees will be divided into groups of 4-6. A group leader will be designated for each day, the leadership rotating through all the trainees. The group leader will have major responsibility for the day's activities. Each group of 4-6 will be taken to a watercourse that has previously been impropved by the On Farm Water Management field team and organize the farmers and accomplish a cleaning and maintenance program of the entire length of the improved watercourse. If there are damaged structures, they should be repaired. If funds are needed to accomplish this, the farmer should contribute. Coordination with the On Farm Water Management area Director should be made and his assistance sought in replacing and repairing structures. A member of the On Farm Water Management field team should be present during all phases of the cleaning and maintenance project. He will already have a knowledge of village organization, cooperative spirit, etc., and his assistance should be sought.

Throughout this exercise, it should be the objective of the trainees to instill in the farmers the feeling that this is their project and they will beneift from the cleaning and maintenance project by receiving more water. This should be substantiated by making watercourse loss measurements before and after improvement and sharing the information with the farmers.

QUESTIONS

After the cleaning and maintenance of the selected watercourses is complete, each team will write a report on the experience, discussing problems encountered, mistakes made, lessons learned, and suggestions for improving the effectiveness of such a program. These reports will be discussed at a meeting of the trainers and trainees and the On Farm Water Management Area Director.

Author's Note: These lessons are adapted from the OFWM Training Manual from a Colorado State University (U.S.A.I.D.) project, 1977-78, to be utilized at the University of Agriculture, Faisalabad. This training manual was subsequently published by the University of Agriculture in 1979 and 1980 for use in their training program.

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